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ABSTRACT

This case problem is designed for use by planning, budgeting, or administrative personnel in state or regional vocational educational organizations. The problem involves planning, programming, and budgeting which is best accomplished in small group settings. Each small group should ideally consist of persons with a variety of duties and responsibilities. The faculty of the formal training institute which utilizes this material could be familiar with planning, programming, budgeting systems (PPBS) and the situational context of the participants. The problem is organized as eight sequential steps which are correlated with the instructional outline in VT 009 085: (1) Analysis of Traditional Budget, (2) Manpower Needs, (3) Program Structure, (4) Achievement of Objectives, (5) Estimation of Costs, (6) Estimation of Benefits, (7) Program Budget, and (8) Evaluation of Program Budget and PPBS. The estimated time required to complete each step is provided. Each small group should have a calculator, an adding machine, a typewriter, a few basic references and sufficient space to facilitate the work. Some secretarial services would be desirable and duplicating facilities are necessary. (DM)

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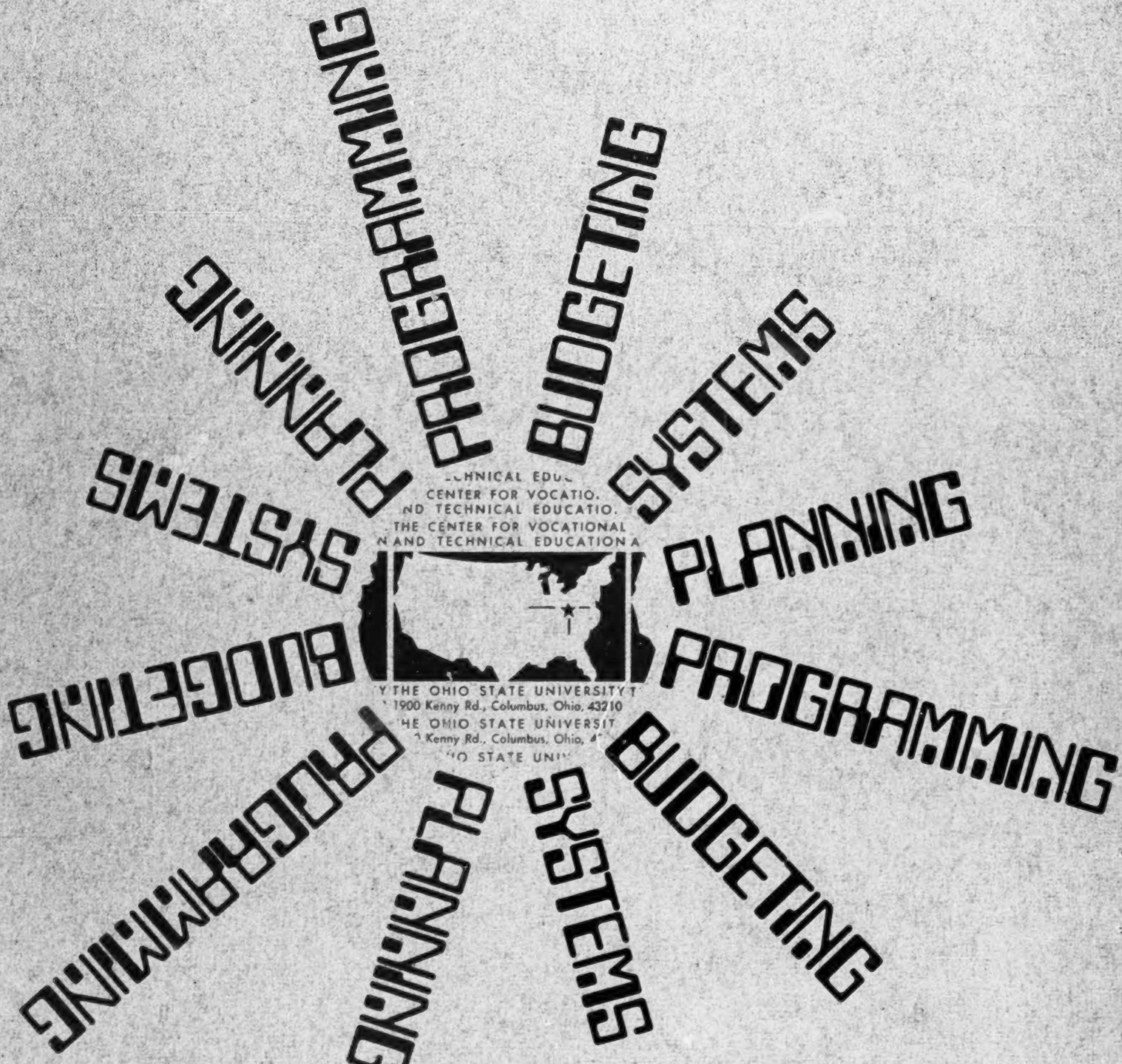
LEADERSHIP 19


PLANNING
PROGRAMMING
BUDGETING
SYSTEMS
THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION
THE OHIO STATE UNIVERSITY
1900 Kenny Rd., Columbus, Ohio, 43210

VT009089

FOR EDUCATORS
VOLUME 2
A CASE PROBLEM

The Center for Vocational and Technical Education has been established as an independent unit on The Ohio State University campus with a grant from the Division of Comprehensive and Vocational Education Research, U. S. Office of Education. It serves a catalytic role in establishing consortia to focus on relevant problems in vocational and technical education. The Center is comprehensive in its commitment and responsibility, multidisciplinary in its approach, and interinstitutional in its program.

The major objectives of The Center follow:

1. To provide continuing reappraisal of the role and function of vocational and technical education in our democratic society;
2. To stimulate and strengthen state, regional, and national programs of applied research and development directed toward the solution of pressing problems in vocational and technical education;
3. To encourage the development of research to improve vocational and technical education in institutions of higher education and other appropriate settings;
4. To conduct research studies directed toward the development of new knowledge and new applications of existing knowledge in vocational and technical education;
5. To upgrade vocational education leadership (state supervisors, teacher educators, research specialists, and others) through an advanced study and inservice education program;
6. To provide a national information retrieval, storage, and dissemination system for vocational and technical education linked with the Educational Resources Information Center located in the U. S. Office of Education.

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LEADERSHIP SERIES NO. 19

FINAL REPORT
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PROJECT NO. 7-0158
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PROGRAM, PLANNING, BUDGETING SYSTEMS FOR EDUCATORS. VOLUME II: A CASE PROBLEM

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PREFACE

One of the major commitments of The Center for Research and Leadership Development in Vocational and Technical Education is state leadership development and training. In 1967, The Center sponsored a national conference on the *Emerging Role of State Departments of Education with Specific Implications for State Divisions of Vocational Education*. One of several important outgrowths of this conference was the recognition of a greater need for rational systems for planning, programming and budgeting state educational needs.

The Vocational Education Amendments of 1968 further reinforce this concept and require states to submit state educational plans for the current year and projected for the succeeding four years. Such requirements necessitate long-range planning, development and program evaluation by the states. In recent years, considerable emphasis has been placed on economic models for planning a variety of programs, including education. Program planning and budgeting systems have received new eminence and are being implemented in a variety of settings. It appears that the concepts underlying PPBS will exert an even greater influence in decisions concerning vocational and technical education in the future.

In October of 1968, The Center sponsored a two-week institute on program planning and budgeting systems for state level personnel in vocational and technical education. Four volumes of leadership training materials on the applications of program planning and budgeting systems to vocational and technical education systems were prepared. These were tested in the institute and have been further refined. Volume I constitutes the basis for a training program in PPBS. It outlines the parameters of PPBS and, more importantly, explores the interrelationships of the concepts and methodologies undergirding the system. Supplementing this basic volume are three additional volumes which complete the total training package. Volume II presents a simulated case problem to which the concepts of PPBS delineated in Volume I can be applied. Volume III contains annotated bibliographies of literature relevant to PPBS, and Volume IV is a research bibliography.

We trust that this instructional materials package will be of use in leadership development programs in the various states. We invite suggestions and comments directed toward their improvement and further refinement. The Center is grateful to the many individuals and groups who contributed to the content and review of these materials. Special recognition is due Joseph H. McGivney, formerly specialist at The Center and now a member of the faculty at Syracuse University, and William C. Nelson, research associate at The Center, for their work, development and authorship of this training package.

Robert E. Taylor
Director
The Center for Vocational
and Technical Education

INTRODUCTION

This volume is the second volume in a series of training material volumes designed to provide educators with the concepts, techniques and insights into the processes of Planning, Programming, Budgeting Systems (PPBS). Each of the volumes may be used alone; however, they compliment each other and are aimed at providing a complete package of training materials for a training institute.

Volume I, Planning, Programming, Budgeting Systems Instructional Outline, is a text outlining the concepts and methodologies of PPBS. It includes materials designed both for projectuals and hand-outs.

Volume III, Planning, Programming, Budgeting Systems for Educators: An Annotated Bibliography, will contain a variety of selected references on PPBS and other decision-making processes. It will be organized in the same manner as the first two volumes.

Volume IV, Planning, Programming, Budgeting Systems for Educators: Research Bibliography, contains a comprehensive listing of references on PPBS.

The case problem is not intended to be an authoritative guideline to procedures of PPBS, but rather an example which explicitly considers objectives, alternative activities, costs and benefits over a multiyear time span, the essential characteristics of a PPB System. Although the case ignores the management structure of the agency, the procedures of PPBS exhibited in the problem can be easily combined with and complement the concepts of participatory planning and management. This combination would be especially valuable in formulating objectives and alternative activities.

The authors wish to acknowledge the contributions of the following persons in the development of this volume through their comments and critical reviews: Joseph Malinski, Division of Vocational-Technical Education, State of Minnesota; Harold V. McAbee and Alan Lee, Oregon State System of Higher Education; and Otto Legg, and Emanuel Weinstein, Division of Vocational and Technical Education, Department of Health, Education and Welfare.

Acknowledgement is also given to Robert C. Young, Calvin J. Cotrell, and Aaron J. Miller of The Center staff for their internal review of the volume.

Joseph H. McGivney

William C. Nelson

4/

TABLE OF CONTENTS

iii Preface
v Introduction
ix List of Tables
x List of Forms

SECTION I INSTRUCTIONS

5 THE INSTRUCTOR'S GUIDE

5 Participants
5 Faculty
5 Sequence
7 Time
8 Facilities

8 THE CASE PROBLEM

8 The Case Method
9 The Situation
10 Expected Output

SECTION II PROBLEM

SEQUENCE OF STEPS

16 Step I. Analysis of a Traditional Budget
20 Step II. Manpower Needs
40 Step III. Program Structure
46 Step IV. Achievement of Objectives
62 Step V. Estimation of Costs
74 Step VI. Estimation of Benefits
90 Step VII. The Program Budget
102 Step VIII. Evaluation of PPBS

103 GLOSSARY

113 A SELECTED BIBLIOGRAPHY

SECTION III APPENDICES

123 Appendix A. Omega State Plan for Vocational Education
133 Appendix B. Omega State Budget for Vocational Education
153 Appendix C. Program Evaluation Checklist
161 Appendix D. A Benefit-Cost Problem

LIST OF TABLES

Page
25 Table 1. Projection of Student Age Population
26 Table 2. Projected University, College, and College Preparatory Enrollments
27 Table 3. Projection of Unemployed Labor Force
28 Table 4. Projections of Labor Force Requirements
50 Table 5. Alternative Activities
51 Table 6. Summary of Present Labor Force Requirements and Trained Output
66 Table 7. Summary of Annual Education Costs by Instructional Area
79 Table 8. Summary of the Monetary Benefits of Education
88 Table 9. Summary of Data for Estimation of Lifetime Monetary Benefits
99 Table 10. Federal, State and Local Expenditures for Vocational Education

APPENDICES

165 Table 1. Estimates of the Biennial Costs and Benefits of the Proposed Post-high Program
166 Table 2. Estimates of the Biennial Costs and Benefits of the Proposed High School Program
167 Table 3. Future Earnings Discounted at Five Percent
168 Table 4. Future Earnings Discounted at Ten Percent

8/

LIST OF FORMS

Page		
17	Form A.	Description of Objectives and Method of Attainment
22	Form B.	Summary of Potential Student Population
23	Form C.	Potential Vocational Education Enrollment by Occupation: Year ____
24	Form D.	Summary of the Potential Vocational Education Enrollments by Occupation for Five Years
42	Form E.	The Mission and Goals of the SDVE
43	Form F.	Summary of the Objectives of the SDVE
44	Form G.	An Objective and Sub-objectives of the SDVE
48	Form H.	Description of Alternatives
49	Form I.	Personnel and Facility Requirements
63	Form J.	Costs of Alternatives
64	Form K.	Summary of Program Element and Subelement Costs
65	Form L.	Summary of Program Category and Element Costs
76	Form M.	Average Annual Net Benefits per Graduate
77	Form N.	Net Benefits of Program Elements and Subelements
78	Form O.	Net Benefits of Program Category and Elements
92	Form P.	Budget for SDVE: Summary of Program Subelements
93	Form Q.	Budget for SDVE: Summary of Program Elements
94	Form R.	Budget for SDVE: Summary of Program Categories
95	Form S.	Summary of Program Costs by Category and Item
96	Form T.	Summary of Needed Funds by Category and Source
97	Form U.	Program Memoranda
98	Form V.	Title Page

PROGRAM, PLANNING, BUDGETING SYSTEMS FOR EDUCATORS. VOLUME II: A CASE PROBLEM

STEPS

INSTRUCTIONS

INSTRUCTOR'S GUIDE

Participants

The case problem is designed for use by planning, budgeting, or administrative personnel in state or regional educational organizations. Although the case considers only vocational education, the process of PPBS exhibited in the problem has relevancy for general education and other governmental activities.

Work on the case will be carried out most efficiently and will yield the greatest benefits to the participant if it is done by small groups. As the problem involves planning, programming, and budgeting, these small groups should ideally consist of persons with a variety of duties and responsibilities. Within a state division of vocational education, a typical group may consist of a state director or assistant director, one or two planning officers, one or two budget officers and one or two accountants.

Faculty

The faculty of the formal training institute should be familiar with PPBS and the situational context of the participants. Ideally, one or more of the faculty members will have developed a PPB System or worked in an organization which operated within a PPB System. Also, faculty members with specialized knowledge in economics, manpower planning, system analysis, budgeting, accounting, and management would be desirable. One person may have all these skills, but usually these needs will require a number of people. All faculty members should go through the entire program before attempting to conduct a formal training institute.

Sequence

The problem is organized as eight sequential steps which include all the basic processes in PPBS plus two evaluation steps. Step 1, Analysis of a Traditional Budget, is designed to identify the omissions of a line-item budget through questions about the objectives and activities of the agency.

The Identification of Manpower Needs, Step 2, is one of the more complex steps. This step has been greatly simplified through presentation of labor force and population projections, thereby eliminating the problem of computing them and ignoring the many assumptions involved in projections of this nature. If greater emphasis on this step is desired, the effects of interstate migration, high school and college dropout rates, changes in the overall unemployment rates, intrastate mobility of persons, sex composition of potential students, and techniques of estimation can be considered by the participants and faculty. Sensitivity analysis can be carried out with respect to the effect of changing these assumptions upon manpower needs and potential educational enrollments.

The most important aspect of PPBS is considered in Step 3, Program Structure. This involves the formulation of the mission, goals and objectives which provide the framework of the program budget and all successive analysis. A special emphasis should be placed on the formulation of objectives.

Perhaps the second most critical aspect of the PPB System is the formulation of alternative methods of achieving the objectives. Step 4, Achievement of Objectives, consists of identifying three alternative methods which will meet an objective to the same degree. The participants will also be required to estimate the number of personnel and quantity of physical facilities necessary to implement each of the alternative activities. If an identical program structure has been developed or adopted by all groups in Step 3, a great deal of time and effort can be saved if each work group develops alternatives for only one goal and its corresponding set of objectives. This procedure can also be used in Steps 5 and 6.

Step 5, Estimation of Costs, consists of attaching costs to personnel and facility requirements and choosing the best alternative through cost-effectiveness analysis. If Step 4 has been completed satisfactorily, this procedure should be relatively uncomplicated.

Assignment of priorities between program elements though benefit-cost analysis in Step 6, Estimation of Benefits, sets the stage for the final formulation of the program budget. A special emphasis should be made to identify unique nonmonetary benefits of program elements and should be considered in the assignment of priorities. Only benefits which are unique, not shared by other program elements, need to be considered, for only these will help to identify differences between elements. The problem of dropouts is ignored in the case, but may be included if deemed necessary and the proper assumptions are made.

Step 7, Program Budget, consists of adjusting the estimated costs of the program to the expected funds from state, local, and federal sources. This may involve identifying new sources of funds or more rapid increases in present sources, or eliminating or reducing the size of program categories and elements. The work groups should have information developed by all groups in this stage so a complete budget can be formulated.

Evaluation of the Program Budget and PPBS, Step 8, is essentially the same process as used in Step 1. Both the final product (the program budget) and the process of planning, programming, and budgeting should be analyzed with particular emphasis on the political and organizational aspects of PPBS.

Ideally, the case problem should be used in conjunction with Volume I, *Planning, Programming, Budgeting Systems for Educators: Instructional*

Outline. The two volumes are complementary and should be combined in the following manner to produce a complete training program.

Vol. I, PPBS for Educators: An Instructional Outline	Vol. II, PPBS for Educators: A Case Problem
Section	Step
1. Overview of PPBS	1. Analysis of Traditional Budget
2. System Theory	2. Manpower Needs
3. The Planning Process	2. Manpower Needs (continued)
4. Investment Alternatives	3. Program Structure
5. Program Budgeting	3. Program Structure (cont.) 4. Achievement of Objectives
6. Analysis of Alternatives	5. Estimation of Costs 6. Estimation of Benefits
7. Programming and Management Control	7. Program Budget
8. Basic Data for PPBS: Its Genesis	7. Program Budget (continued)
9. Limitations of PPBS	8. Evaluation of Program Budget and PPBS

If time constraints are a major factor, alternative combinations of small packages are listed on the next page.

Time

The estimated time required to complete the steps is given in each step; however, this can be shortened if the faculty does some of the computation required in steps 2, 5, and 6 and provides this information to the participants.

Vol. I, PPBS for Educators: An Instructional Outline	Vol. II, PPBS for Educators: A Case Problem
Section	Step
COMBINATION A	
1. Overview of PPBS	2. Manpower Needs
2. Systems Theory	3. Program Structure
3. Planning Process	
4. Investment Alternatives	
5. Program Budgeting	
COMBINATION B	
1. Overview of PPBS	3. Program Structure
4. Investment Alternatives	4. Achievement of Objectives
5. Program Budgeting	
COMBINATION C	
4. Investment Alternatives	5. Estimation of Costs
6. Analysis of Alternatives	6. Estimation of Benefits

Facilities

Facilities for each small group should include a calculator, an adding machine, a typewriter, a few basic references and sufficient space to facilitate the work. Also, some secretarial services would be desirable. Duplicating facilities will be necessary to reproduce multiple copies of each of the sample forms, A through V, to be used by the participants and to reproduce the output of each group in Steps 4, 5, and 6 before work on Step 7.

THE CASE PROBLEM

The Case Method

A case is an account of a situation that contains a problem or set of problems. The objective of a case is to stimulate a group of students to identify the problem or problems and work out solutions.

A case is normally drawn from life and either told straightforwardly or disguised to avoid naming the actual situation. The material is usually presented in an orderly fashion and may contain considerable quantitative information which must be analyzed in order to discover and solve the root problem. A frequent complaint about the case method is that the information presented is inadequate. This is usually deliberate and is done on the assumption that a decision maker never has complete information. In any event, the information is usually greater than that which was actually available at the time the situation took place and probably is presented in a far better organized fashion.

Usually there is no one particular "right" solution to a case. Solutions may depend, in the last analysis, on attitudes toward risk, judgments about ability, etc. Sometimes a case is used simply to demonstrate an analytic technique without too much concern for the solution. The one test for any solution is that it must clearly, logically and demonstrably derive from the facts in the case. A good case analysis should recognize several alternative solutions and indicate why some are less desirable than others.

No case discussion is worthwhile unless all the participants have made adequate preparation. Each participant should have read the case and come to some level of understanding concerning it before the discussion takes place. Often the most difficult portion of a case discussion is the beginning, when most participants are reticent to expose their opinions and thus become vulnerable. Good solid preparation tends to overcome this.

It is a normal practice for the group to discuss a case. The case leader does not lecture; his job is to try to bring out what he considers to be the salient points by questioning, lending emphasis, promoting debate, and, to a limited extent, structuring the discussion.

Participation should be broad and diverse. If one or two people tend to dominate the discussion and the work, it loses its value for the others. Dialogue, rather than unrelated speechmaking, should be encouraged. The direct confrontation of two opinions is an excellent learning device. An opinion should be backed by an orderly array of the facts present within the case.

In general, the case method works best when participants are willing to expose their views before their colleagues and are ready to defend them. If this spirit is present, the case discussion can be a very useful learning experience.

The Situation

The problem in this volume is designed to involve the participants in the essential steps of the PPBS process within the time constraints of the training institute, while providing the degree of rigor and realism which will challenge the knowledge of the participants. The primary objective of this problem is to further familiarize the participants with the process of PPBS as a management and decision-making tool; the accuracy of the final group report is secondary to this purpose.

The case problem is based on the vocational education system in the hypothetical state of Omega, but all reference materials and data are derived from actual state and federal publications. When the information in the reference materials is incomplete for realistic analysis or decisions or when gaps in data are found, the participants are expected to make assumptions based on their background and experience and proceed with the problem. Members of the faculty are familiar with the case problem and may be able to assist in formulating assumptions.

All true costs (local, state, and federal) should be included in the problem. Estimates of federal funds available for use in vocational education during the five years are given in the materials. No maximum or minimum limits are placed on state or local funds; they will depend upon the value of vocational education to the state as stated in the program budgets developed in this Institute.

Small groups, as organized by the instructor, will have the responsibility for developing a five-year program budget which will reflect the mission of the state division of vocational education and may be required to report their work to the total group of participants for constructive criticism at the completion of each step.

Expected Output

Each group will be expected to develop: 1) a final Program Budget; 2) Program Memoranda; and 3) Program Analysis. The Program Budget should consist of Forms V, T, S, R, Q, and P arranged in the following order: Form V, R, S, and T, followed by sets of Forms Q and P grouped according to program category. Multiple use of some forms will probably be necessary for all three outputs.

The Program Memoranda and Analysis will provide the back-up data to the Program Budget. This should consist of one Program Memoranda, Form U, for each program category. In addition, Program Memoranda may be developed for program elements. Following each Program Memoranda should be the analysis, Forms B through O, grouped according to program category and element.

Each participant should place a special emphasis on understanding the terminology presented in the glossary. This will greatly facilitate the learning process and minimize confusion due to semantics. Several books are available which will serve as a general introduction to the concepts of PPBS. Some of these are:

1. Harry J. Hartley, *Educational Planning-Programming-Budgeting, A Systems Approach* (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1968).

2. Harry P. Hatry and John F. Cotton, *Program Planning for State, County, City* (Washington, 1967).

3. Faemont J. Lyden and Ernest G. Miller (ed.), *Planning, Programming, Budgeting: A Systems Approach to Management* (Chicago: Mackham Publishing Co., 1967).

4. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume I: An Instructional Outline* (Columbus: The Center for Vocational and Technical Education, 1969).

5. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).

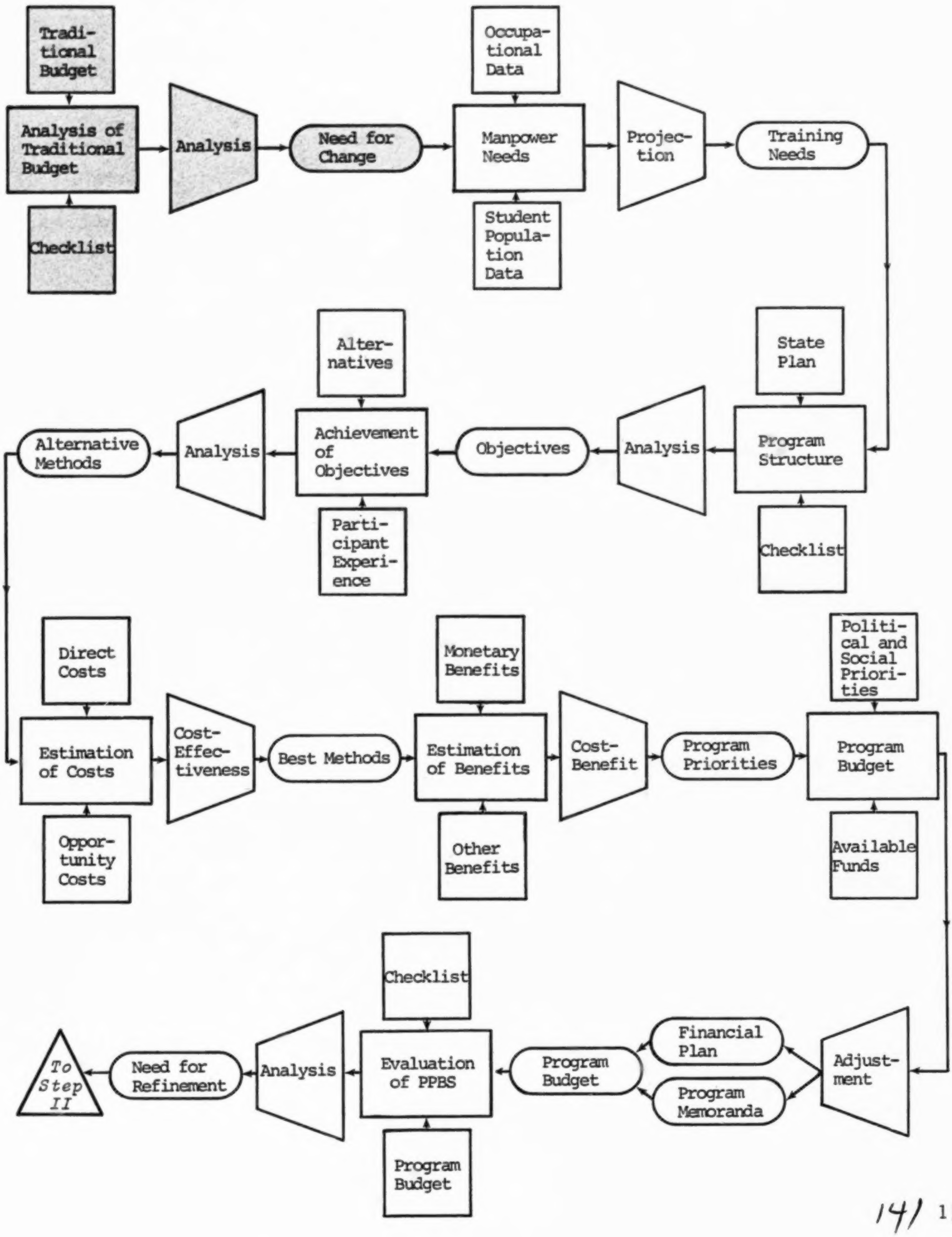
6. N.E.A. Committee on Educational Finance, *Planning for Educational Development in a PPB System* (Washington, D.C.: N.E.A., 1968).

7. John Pfeiffer, *New Look at Education; System Analysis in our Schools and Colleges* (New York: Odyssey Press, 1968).

8. U. S. Bureau of the Budget, *Planning-Programming-Budgeting, Bulletin No. 66-3, Supplement to Bulletin No. 66-3, Bulletin No. 68-2, Bulletin No. 68-9* (1965, 1966, 1967, 1968).

PROBLEM

SEQUENCE OF STEPS


Traditional Budget
Analysis of Traditional Budget
Checklist
Analysis
Need for Change
Occupational Data
Manpower Needs
Student Population Data
Projection
Training Needs
State Plan
Program Structure
Checklist
Analysis
Objectives
Alternatives
Achievement of Objectives
Participant Experience
Analysis
Alternative Methods
Direct Costs
Estimation of Costs
Opportunity Costs
Cost-Effectiveness
Best Methods
Monetary Benefits
Estimation of Benefits
Other Benefits
Cost-Benefit
Program Priorities
Political and Social Priorities
Program Budget
Available Funds
Adjustment
Financial Plan
Program Memoranda
Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

141

STEP I. ANALYSIS OF TRADITIONAL BUDGET (OPTIONAL)

Purpose: To critically analyze a traditional line-item budget with respect to rational decision making.

Time: Two hours.

Materials: Appendix A. Omega State Plan for Vocational Education

Appendix B. Omega State Budget for Vocational Education

Appendix C. Program Evaluation Checklist

Procedure:

1. Go through line-item budget and discuss the questions on the Program Evaluation checklist; identify objectives and methods of attainment.

2. Could you justify this budget to the funding authorities?

3. Would you as a member of the central budget bureau, legislature, or as the governor, be willing to authorize this budget?

Forms: Form A. Description of Objectives and Methods of Attainment.

References:

1. Jesse Burkhead, *The Theory and Application of Program Budgeting to Education* (New York: Syracuse University, Maxwell Graduate School of Citizenship and Public Affairs, 1965).

2. William B. Castetter and Leon Ovsiew, *Budgeting for Better Schools* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1960).

3. J. A. Dei Rossi, *Comparing the Program Budget and the Traditional Budget* (RAND Corporation, 1968).

4. George Washington University, *Planning-Programming-Budgeting for City, State, County Objectives. PPB Note 1: Answering the Question, Is an Integrated Planning, Programming, Budgeting System Useful for Our Jurisdiction?* (Washington, D.C.: George Washington University, 1967).

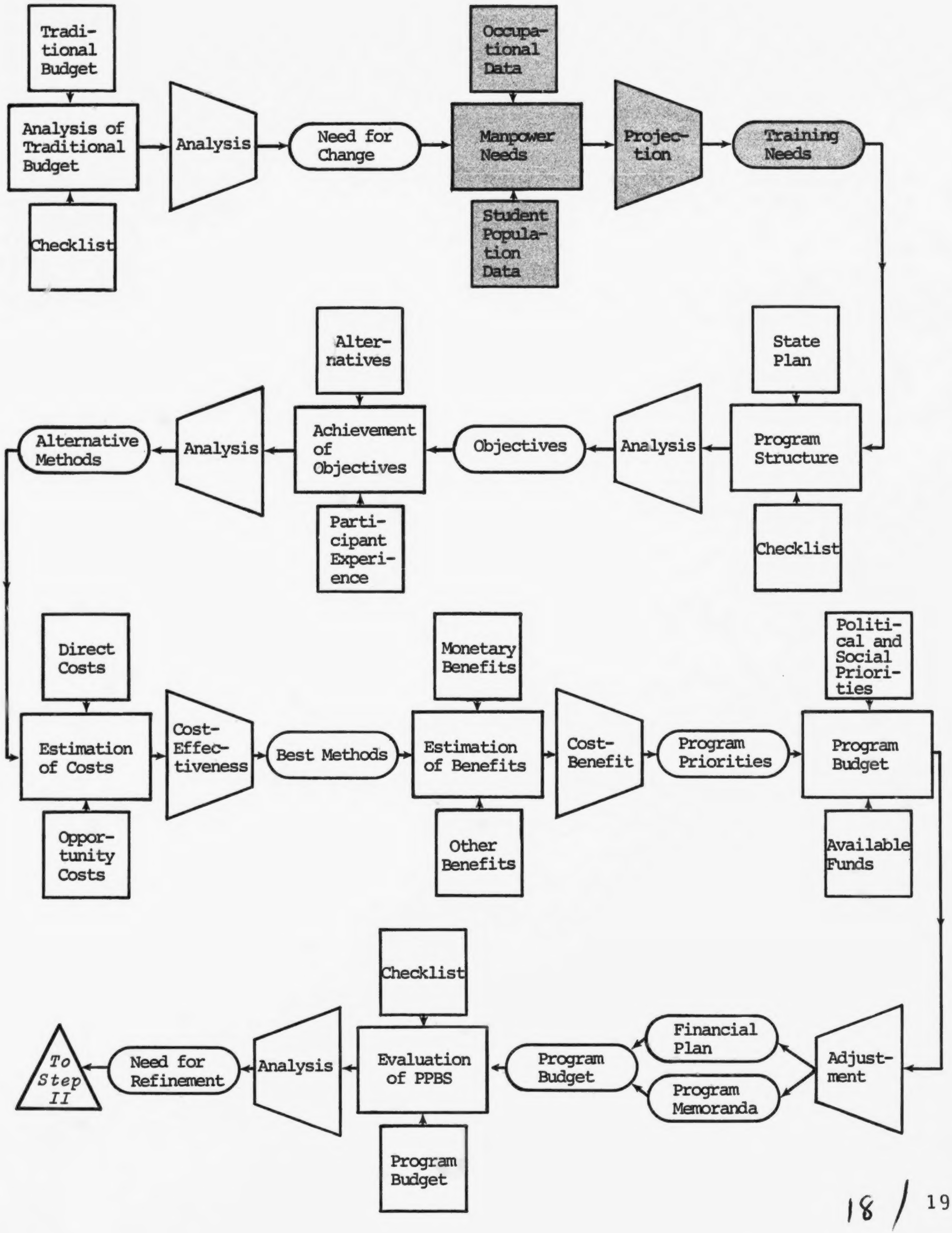
5. W. L. Henderson, "Do Budgets Report Public Spending," *Arizona Review of Business and Public Administration* (1964).

6. Subcommittee on Economic Statistics of the Joint Economic Committee, *The Federal Budget as an Economic Document* (Washington, D. C.: The Subcommittee, U. S. Government Printing Office, 1962).

FORM A. DESCRIPTION OF OBJECTIVES AND METHOD OF ATTAINMENT

No.	Goal and/or Objective	Method of Attainment

SEQUENCE OF STEPS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Available Funds
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Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

STEP II. MANPOWER NEEDS

Purpose: To develop total manpower needs of a state and to estimate the need for vocational education.

Time: Four to eight hours.

Materials:
1. Table 1. Projection of Student Age Population.
2. Table 2. Projected University, College, and College Preparatory Enrollments.
3. Table 3. Projection of Unemployed Labor Force.
4. Table 4. Projections of Labor Force Requirements.

Procedure :
1. Determine the potential student population.
    - a. subtract university and college prep. students from total student population.
    - b. add Unemployed Labor Force to the remainder in 1-a.
2. Determine the potential size of vocational education program; use the minimum number, potential student population or labor force needs, and allocate the student population to labor force areas.

Forms:
Form B. Summary of Potential Student Population.
Form C. Summary of the Potential Vocational Education Enrollments by Occupation: Year ____.
Form D. Potential Vocational Education Enrollments by Occupation for Five Years.

References:

1. Agency for International Development, *Techniques for Determining Manpower Skill Needs and Training Requirements* (Washington, D. C.: U. S. Department of State, 1963).
2. March, G. B. (ed.), *Occupational Data Requirements for Educational Planning* (Wisconsin: University of Wisconsin, 1966).
3. Morsch, William C., *A Technique for Projection of Occupational-Educational Requirements for State Educational Planning Areas* (1966).

4. Operation PEP, *The Steps and Tools of Systems Analysis as Applied to Education* (Burlingame, California, 1967).

5. Ross, Arthur M. (ed.), *Employment Policy and the Labor Market* (Berkeley: University of California Press, 1965).

6. State of Minnesota, *Projected Program Activities in Vocational-Technical Education* (Minnesota: Division of Vocational-Technical Education, 1968).

7. Stoller, David S., *Occupational Education Requirements Analysis, A Method Projecting Vocational Education Requirements* (Washington, D. C., 1967).

8. U. S. Department of Labor, Manpower Administration, Bureau of Employment Security, *Guide to Local Occupational Information--United States Employment Service, State Employment Services* (Washington, D. C.: U. S. Government Printing Office, 1966).

FORM B. SUMMARY OF POTENTIAL STUDENT POPULATION

	Years									
	1	2	3	4	5	6	7	8	9	10
Secondary Male Female Subtotal										
Post-Secondary Male Female Subtotal										
Adult Male Female Subtotal										
Special Needs Male Female Subtotal										
Total Male Female										

FORM C. POTENTIAL VOCATIONAL EDUCATION ENROLLMENT BY OCCUPATION: YEAR _______

Occupational Type	Secondary		Post-Secondary		Adult		Special Needs		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female

FORM D. SUMMARY OF THE POTENTIAL VOCATIONAL EDUCATION ENROLLMENTS BY OCCUPATION FOR FIVE YEARS

Occupational Type	Years				
	1	2	3	4	5

TABLE 1. PROJECTION OF STUDENT AGE POPULATION*

Year	Age						
	15	16	17	18	19	20	21
0	83,300	82,700	82,600	81,000	72,100	63,500	62,900
1	86,300	83,300	82,700	82,600	81,000	72,100	63,500
2	88,400	86,300	83,300	82,700	82,600	81,000	72,100
3	89,000	88,400	86,300	83,300	82,700	82,600	81,000
4	90,700	89,000	88,400	86,300	83,300	82,700	82,600
5	92,200	90,700	89,000	88,400	86,300	83,300	82,700
6	93,500	92,200	90,700	89,000	88,400	86,300	83,300
7	95,400	93,500	92,200	90,700	89,000	88,400	86,300
8	96,400	95,400	93,500	92,200	90,700	89,000	88,400
9	97,900	96,400	95,400	93,500	92,200	90,700	89,000
10	99,000	97,900	96,400	95,400	93,500	92,200	90,700

*Assume 50 percent of the students are female.

TABLE 2. PROJECTED UNIVERSITY, COLLEGE, AND COLLEGE PREPARATORY ENROLLMENTS*

Year	Age						
	15	16	17	18	19	20	21
0	41,700	41,400	37,200	32,400	18,000	12,700	9,400
1	43,200	41,700	37,200	33,000	20,300	14,400	9,500
2	44,200	43,200	37,500	33,000	20,700	16,200	10,800
3	44,500	44,200	38,800	33,300	20,700	16,500	12,200
4	45,400	44,500	39,800	34,500	20,800	16,500	12,400
5	46,100	45,400	40,000	35,400	21,600	16,700	12,400
6	46,800	46,100	40,800	35,600	22,100	17,300	12,500
7	47,700	46,800	41,500	36,300	22,300	17,700	12,900
8	48,200	47,700	42,100	36,900	22,700	17,800	13,300
9	49,000	48,200	42,900	37,400	23,000	18,100	13,400
10	49,500	49,000	43,400	38,200	23,400	18,400	13,600

*Assume 50 percent are female.

TABLE 3. PROJECTION OF UNEMPLOYED LABOR FORCE*

Year	Population Groups				
	Age 22-30	Age 31-50	Age 51-65	Special Needs	Total
0	17,312	3,847	5,772	11,542	38,473
1	17,334	3,852	5,778	11,556	38,520
2	17,523	3,894	5,841	11,682	38,940
3	17,685	3,930	5,895	11,791	39,301
4	17,762	3,947	5,921	11,842	39,472
5	17,896	3,977	5,965	11,932	39,770
6	17,963	3,992	5,988	11,975	39,918
7	18,032	4,007	6,012	12,022	40,073
8	18,114	4,026	6,038	12,076	40,254
9	18,256	4,058	6,085	12,171	40,570
10	18,361	4,080	6,121	12,241	40,803

*Assume 50 percent of unemployed labor force is female.

TABLE 4. PROJECTIONS OF LABOR FORCE REQUIREMENTS*

01.00 Agriculture

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
01	Agricultural Production	181,000	0	5060	0	5060	0	5060	0	5060	0	5060
02	Agricultural Supplies	7,000	100	700	100	700	100	700	100	700	100	700
03	Agricultural Mechanics	18,000	300	1800	300	1800	300	1800	300	1800	300	1800
04	Agricultural Products	5,000	200	500	200	500	200	500	200	500	200	500
05	Ornamental Horticulture	2,000	200	200	200	200	200	200	200	200	200	200
06	Agricultural Resources	7,000	0	700	0	700	0	700	0	700	0	700
07	Forestry	7,000	100	700	100	700	100	700	100	700	100	700
09	Agriculture, Other	8,000	100	800	100	800	100	800	100	800	100	800
	TOTAL	235,000	1000	10460	1000	10460	1000	10460	1000	10460	1000	10460

*Occupational area codes are based on *Standard Terminology for Instruction in Local and State School Systems*, U.S. Department of Health, Education, and Welfare, May 1967.

TABLE 4a. PROJECTIONS OF LABOR FORCE REQUIREMENTS

04.00 Distributive Education

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
01	Advertising Services	4,200	290	460	300	490	320	520	350	560	380	600
02	Apparel and Accessories	9,500	660	1,040	700	1,150	750	1,250	810	1,420	870	1,490
03	Automotive	3,500	240	380	260	410	280	440	300	480	320	500
04	Finance and Credit	3,900	270	430	280	450	300	490	330	530	360	560
05	Floristry	NOT AVAILABLE										
06	Food Distribution	7,000	490	770	510	810	550	890	590	950	640	1,010
07	Food Services	10,650	740	1,170	790	1,250	840	1,350	900	1,470	980	1,540
08	General Merchandise	5,940	410	650	430	710	450	770	480	810	540	860
09	Hardware, Equipment	6,120	430	760	440	690	470	730	510	790	560	880
10	Home Furnishings	4,450	310	490	320	510	340	540	370	600	410	640
11	Hotel and Lodging	11,250	790	1,240	850	1,400	910	1,490	960	1,550	1,030	1,620

TABLE 4b. PROJECTIONS OF LABOR FORCE REQUIREMENTS

04.00 Distributive Education

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
12	Industrial Marketing	3,000	210	330	290	400	390	520	470	690	550	870
13	Insurance	6,240	440	690	460	750	490	800	530	860	570	900
14	International Trade	NOT	AVAILABLE									
15	Personal Services	25,120	1,760	2,760	1,850	3,000	2,000	3,250	2,200	3,500	2,300	3,620
16	Petroleum	3,500	240	380	260	410	280	440	300	480	320	500
17	Real Estate	1,960	140	210	150	220	160	250	170	260	180	280
18	Recreation & Tourism	NOT	AVAILABLE									
19	Transportation	2,000	140	220	140	230	150	250	160	270	180	290
20	Retail Trade, Other	13,570	950	1,490	990	1,480	1,050	1,460	1,120	1,450	1,240	1,420
31	Wholesale Trade, Other	1,500	100	160	100	170	110	180	120	200	140	220
99	Other	4,000	260	410	300	490	350	600	390	550	400	550
	TOTAL	127,400	8,870	13,950	9,420	13,760	10,190	16,220	11,060	17,420	11,970	21,350

TABLE 4c. PROJECTIONS OF LABOR FORCE REQUIREMENTS

07.00 Health Occupations Education

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
01	Dental	890	110	300	120	320	140	350	160	370	180	420
02	Medical Lab Technology	1,070	180	400	200	500	230	620	270	750	330	900
03	Nursing	11,510	2,980	5,500	3,210	6,200	3,400	7,000	3,800	7,740	4,120	8,940
04	Rehabilitation	150	90	130	90	130	100	150	120	190	140	240
05	Radiologic	610	50	170	60	190	80	230	100	310	130	440
06	Ophthalmic	50	30	50	40	60	50	80	60	90	80	110
07	Environmental Health	220	140	200	170	250	190	300	200	340	210	360
08	Mental Health Tech.	170	50	90	60	110	70	140	80	170	100	200
09	Miscellaneous Health	740	230	680	250	750	280	950	320	1,200	370	1,550
99	Other	N O T	A V A	I L A	B L E							
	TOTAL	15,410	3,860	7,520	420	8,510	4,540	9,820	5,110	11,160	5,660	13,160

TABLE 4d. PROJECTIONS OF LABOR FORCE REQUIREMENTS

09.00 Home Economics

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
01	Homemaking	NOT	AVA	ILA	BLE							
02	Occupational Preparation	38,400	760	2,290	770	2,250	790	2,100	810	1,800	830	1,650
99	Other	1,320	40	100	50	140	80	190	120	250	160	310
	TOTAL	39,720	800	2,390	820	2,390	870	2,290	930	2,050	990	1,960

TABLE 4e. PROJECTIONS OF LABOR FORCE REQUIREMENTS

14.00 Office Occupations

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
01	Accounting	10,980	1,310	3,240	1,400	3,600	1,700	4,300	2,700	5,000	4,390	5,740
02	Business Data Processing	2,850	690	950	720	1,050	790	1,210	910	1,340	1,180	1,600
03	General Office	23,370	2,890	4,540	3,340	5,100	3,960	6,730	4,890	7,410	6,280	9,380
04	Information Communication Operator	3,140	1,040	1,710	1,410	2,320	1,960	3,190	2,580	3,840	3,250	4,740
05	Materials Support	160	110	130	130	170	210	250	260	310	330	370
06	Personnel and Training	NOT AVAILABLE	250	340	270	400	320	460	410	590	560	800
07	Secretarial	25,100	3,710	7,960	3,950	8,700	4,320	9,910	4,780	11,000	5,270	12,310
08	Supervisory, Management	2,160	1,160	2,000	1,240	2,310	1,470	2,600	1,690	2,820	1,940	3,100
09	Typing	14,190	2,250	4,720	2,730	5,110	3,490	6,640	3,980	7,960	4,320	8,800
99	Other	1,640	340	560	350	610	390	740	460	900	580	1,040
	TOTAL	83,590	13,750	26,150	15,540	29,370	18,610	36,030	22,660	41,170	28,100	47,880

TABLE 4f. PROJECTIONS OF LABOR FORCE REQUIREMENTS

16.00 Technical Education

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
01	Engineering Technology	37,400	6,910	8,100	7,230	8,900	7,690	10,200	8,470	11,800	11,280	13,700
02	Agricultural Technology	1,610	180	280	200	340	230	390	260	430	280	480
03	Health Technology	680	80	120	80	130	80	140	100	180	140	220
04	Office Technology	400	30	50	40	70	50	90	60	100	70	110
05	Home Ec. Technology	NOT	AVA	ILA	BLE							
06	Miscellaneous Tech.	3,390	110	180	130	210	170	280	230	400	320	530
99	Other	4,820	130	210	170	270	210	390	260	490	320	570
	TOTAL	48,300	7,440	8,940	7,850	9,920	8,430	11,490	9,380	13,400	12,410	1,560

TABLE 4g. PROJECTIONS OF LABOR FORCE REQUIREMENTS

17.00 Trade and Industrial

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
01	Air Conditioning	1,480	60	140	70	160	90	190	110	220	140	250
02	Appliance Repair	5,960	80	170	80	180	90	210	110	250	130	310
03	Automotive Services	14,010	0	240	0	240	0	250	0	260	0	280
04	Aviation Occupations	2,870	170	430	170	410	160	390	150	370	130	360
05	Blueprint Reading	N O T	A V A	I L A	B L E							
06	Business Machine Maintenance	840	20	50	20	50	30	50	40	60	40	60
07	Commercial Art	1,700	60	110	80	140	110	180	140	210	160	230
08	Commercial Fisheries	N O T	A V A	I L A	B L E							
09	Commercial Photography	520	30	50	30	60	40	80	40	90	40	100
10	Maintenance, Construction	47,280	830	1,670	870	1,780	930	2,110	1,020	2,470	1,190	2,860
11	Custodial Services	20,040	230	510	240	520	260	540	280	570	290	600

TABLE 4h. PROJECTIONS OF LABOR FORCE REQUIREMENTS

17.00 Trade and Industrial

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
12	Diesel Mechanic	1,900	140	230	140	240	150	260	160	280	180	300
13	Drafting	N O T	A V A	I L A	B L E							
14	Electrical Occupations	5,830	180	280	200	310	220	350	240	420	260	500
15	Electronics Occupations	6,130	890	1,070	1,050	1,320	1,370	1,680	1,720	1,980	2,110	2,440
16	Fabric Maintenance	5,610	30	40	30	50	40	60	40	70	40	70
17	Foremanship & Management	N O T	A V A	I L A	B L E							
18	General Continuation	N O T	A V A	I L A	B L E							
19	Graphic Arts	7,200	110	210	130	240	150	270	170	300	180	330
20	Industrial Atomic Energy	N O T	A V A	I L A	B L E							
21	Instruments Maintenance	590	10	30	10	30	10	30	10	30	10	30
22	Maritime Occupations	N O T	A V A	I L A	B L E							

TABLE 4i. PROJECTIONS OF LABOR FORCE REQUIREMENTS

17.00 Trade and Industrial

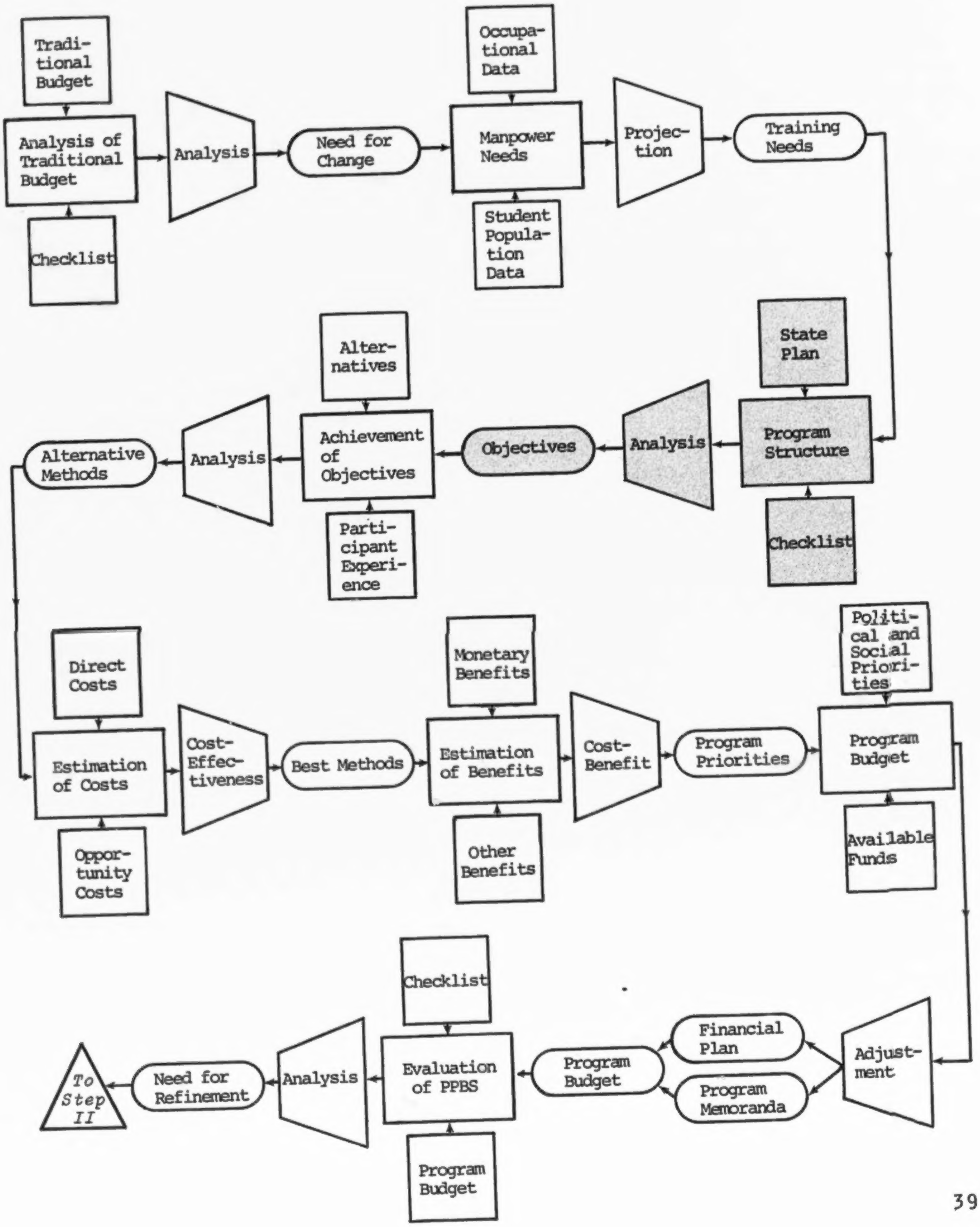
Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
23	Metalworking	29,450	1,080	2,030	1,210	2,210	1,290	2,480	1,380	2,670	1,510	2,960
24	Metallurgy	2,560	30	100	40	110	40	120	40	120	40	120
25	Nucleonic Occupations	NOT	AVA	ILA	BLE							
26	Personal Services	10,430	480	820	480	840	510	920	540	990	580	1,070
27	Plastics Occupations	7,840	90	120	140	190	230	320	340	510	480	700
28	Public Services	NOT	AVA	ILA	BLE							
29	Quantity Food Occupations	18,550	390	590	400	630	410	700	420	800	440	910
30	Refrigeration	NOT	AVA	ILA	BLE							
31	Small Engine Repair	NOT AVAILABLE	80	120	80	140	70	160	70	180	60	200
32	Stationary Energy Sources	5,280	10	40	10	40	10	30	10	30	10	30
33	Textile Production	NOT AVAILABLE	40	70	30	60	30	60	30	60	30	60
34	Leather Wkg.	400	0	10	0	20	0	20	0	20	0	20

TABLE 4j. PROJECTIONS OF LABOR FORCE REQUIREMENTS

17.00 Trade and Industrial

Instructional or Occupational Areas		Current Employment t = 0	Projected Labor Force Requirements									
			Year 1		Year 2		Year 3		Year 4		Year 5	
Code	Description		Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total	Expansion	Total
35	Upholstering	890	10	30	10	30	10	30	10	30	20	40
36	Woodworking	330	40	70	50	80	60	90	60	100	60	100
37	Mining and Quarrying	N O T	A V A	I L A	B L E							
99	Other	11,890	1,000	1,330	1,040	1,410	1,110	1,590	1,200	1,720	1,300	1,830
	TOTAL	209,610	6,090	10,560	6,610	11,490	7,420	13,170	8,330	14,810	9,430	16,760

SEQUENCE OF STEPS


Traditional Budget
Analysis of Traditional Budget
Checklist
Analysis
Need for Change
Occupational Data
Manpower Needs
Student Population Data
Projection
Training Needs
State Plan
Program Structure
Checklist
Analysis
Objectives
Alternatives
Achievement of Objectives
Participant Experience
Analysis
Alternative Methods
Direct Costs
Estimation of Costs
Opportunity Costs
Cost-Effectiveness
Best Methods
Monetary Benefits
Estimation of Benefits
Other Benefits
Cost-Benefit
Program Priorities
Political and Social Priorities
Program Budget
Available Funds
Adjustment
Financial Plan
Program Memoranda
Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

STEP III. PROGRAM STRUCTURE

Purpose: To develop and organize operational objectives for vocational education which will provide the framework of a multi-year program budget.

Time: Two to four hours.

Materials:
1. Output from Forms A, B, C, and D from Steps I and II.
2. Appendix A. Omega State Plan of Vocational Education.
3. Appendix C. Program Evaluation Checklist.

Procedure:
1. State overall mission of State Division of Vocational Education (SDVE).
2. State the goals of SDVE. (Goals should be stated in terms of occupational and/or clientele groups.)
3. State the objectives of the SDVE. (Objectives should be stated in the same terms as goals and include a tentative specification of quantity and quality over a five-year time period.)
4. Optional: State the sub-objectives of the SDVE. (Sub-objectives should be a more detailed specification of each objective.)

Forms:
Form E. The Mission and Goals of the SDVE.
Form F. Summary of the Objectives of the SDVE.
Form G. An Objective and Sub-objectives of the SDVE.

References:

1. S. M. Barro, *Development of a Program Structure for a Public School System* (RAND Corporation, 1968).
2. Warren Biggs Fitzsimmons, *A Model for a Public School Program Budget* (Colorado: Colorado State College, 1966).
3. George Washington University, *Planning-Programming-Budgeting for City, State, County Objectives, PPB Note 5: Developing an Objective Oriented Governmental Program Structure* (Washington, D. C.: George Washington University, 1967).
4. George Washington University, *Planning-Programming-Budgeting for City, State, County Objectives, PPB Note 7: Output Measures for a Multi-Year Program and Financial Plan* (Washington, D. C.: George Washington University, 1967).

5. *Guideline Outline for State Program Planning and Development for Vocational and Occupational Education*, Program Planning, Development, Budgeting Series, No. 4 (U. S. Office of Education, Bureau of Adult, Vocational, and Library Programs, Division of Vocational and Technical Education).

6. Robert F. Mager, *Preparing Instructional Objectives* (Palo Alto, California: Fearon Publishers, 1962).

7. George Odiorne, *Management by Objectives* (New York: Pitman and Sons, 1966).

8. Operation PEP, *A Managers Guide to Objectives* (Burlingame, California: 1968).

9. Operation PEP, *Considerations in Developing a Hierarchy of Educational Objectives* (1968).

FORM E. THE MISSION AND GOALS OF THE SDVE

The mission of the SDVE is:

The goals of the SDVE are:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

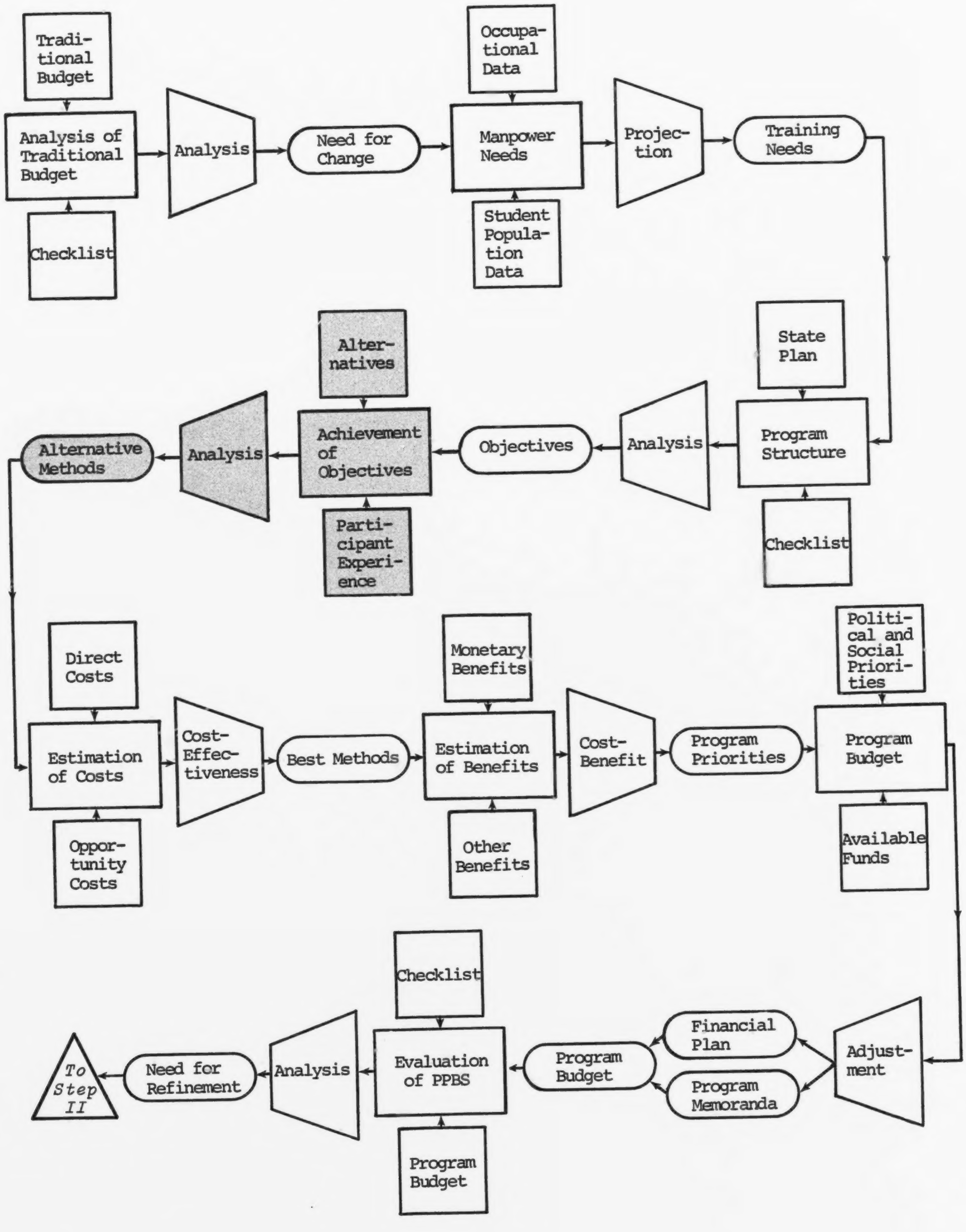
FORM F. SUMMARY OF THE OBJECTIVES OF THE SDVE

Goal No. ________	Quantity and Time				
Objective Statement with Quality Specification	1	2	3	4	5
No. _____					
No. _____					
No. _____					
No. _____					
No. _____					

FORM G. AN OBJECTIVE AND SUB-OBJECTIVES OF THE SDVE

Goal No. ______	Quantity and Time				
	1	2	3	4	5
Objective No. ______					
Sub-objective No. _____					
Sub-objective No. _____					
Sub-objective No. _____					
Sub-objective No. _____					
Sub-objective No. _____					

SEQUENCE OF STEPS


Traditional Budget
Analysis of Traditional Budget
Checklist
Analysis
Need for Change
Occupational Data
Manpower Needs
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Projection
Training Needs
State Plan
Program Structure
Checklist
Analysis
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Alternatives
Achievement of Objectives
Participant Experience
Analysis
Alternative Methods
Direct Costs
Estimation of Costs
Opportunity Costs
Cost-Effectiveness
Best Methods
Monetary Benefits
Estimation of Benefits
Other Benefits
Cost-Benefit
Program Priorities
Political and Social Priorities
Program Budget
Available Funds
Adjustment
Financial Plan
Program Memoranda
Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

STEP IV. ACHIEVEMENT OF OBJECTIVES

Purpose: To specify three alternative methods of achieving each objective and/or sub-objective which will satisfy the conditions of quality, quantity and time.

Time: Four to six hours on each goal and related set of objectives and of sub-objectives.

Materials:
1. Table 5. Alternative Activities.
2. Table 6. Summary of Present Labor Force Requirements and Trained Output.

Procedure:
1. Review goals and objectives developed in Step III and choose one set of a goal and its corresponding objectives for further consideration.
2. Identify the three most feasible alternative methods to achieve each objective and/or sub-objective on the basis of hand-out materials and personal experience. Assume facilities, personnel, etc., are presently available to the extent of the level of trained output in Year 0.
3. Determine the personnel and facilities necessary to implement each alternative method. (Rough estimates of the following inputs: Personnel, administration and instruction; facilities equipment and building space.)

Forms: Form H. Description of Alternatives.

Form I. Personnel and Facility Requirements.

References:

1. Pierre Daouet, "Economic Criteria Governing the Choices of Vocational Training Systems," *International Labor Review*, Volume 98, No. 3, September 1968.
2. Max U. Eninger, *The Process and Product of T. & I. High School Level Vocational Education in the United States*, Volume I and II (Pittsburgh: American Institutes for Research, 1965).
3. Jacob J. Kaufman, C. J. Schaefer, M. V. Lewis, D. W. Stevens, and E. W. House, *The Role of the Secondary Schools in the Preparation of Youth for Employment* (University Park: The Institute for Research on Human Resources, 1967).
4. Garth L. Mangum, *Reorienting Vocational Education* (Washington, D. C.: National Manpower Policy Task Force, 1968).

5. Operation PEP, *Methods-Means Analysis in Education* (Burlingame, California, 1967).

6. Gerald G. Somers, (ed.), *Retraining the Unemployed* (Madison: University of Wisconsin Press, 1968).

FORM H. DESCRIPTION OF ALTERNATIVES

Goal:

Objective:

Sub-objective:

Alternative 1.

Alternative 2.

Alternative 3.

FORM I. PERSONNEL AND FACILITY REQUIREMENTS

Goal:	Years				
Objective:	1	2	3	4	5
Sub-objective:					
Alternative 1. Administration (No. of people) Instruction (No. of people) Equipment (No. and type) Buildings (No. of square feet)					
Alternative 2. Administration (No. of people) Instruction (No. of people) Equipment (No. and type) Buildings (No. of square feet)					
Alternative 3. Administration (No. of people) Instruction (No. of people) Equipment (No. and type) Buildings (No. of square feet)					

TABLE 5. ALTERNATIVE ACTIVITIES

Type of Educational Activity

1. Academic
2. General (vocational and academic)
3. Vocational
    a. Occupational areas
    b. Specific occupations
    c. Subject areas
    d. Cooperative
    e. Laboratory

Combination of Resources

1. Administrators
2. Instructors
3. Building
4. Equipment
5. Students

Clientele Groups

1. Everyone
2. Non-college
3. Unemployed
4. Specific age groups
5. Handicapped
6. Disadvantaged

Type of Educational Institution

1. Primary schools
2. Secondary schools
    a. Comprehensive
    b. Vocational
3. Post-secondary schools
    a. Junior colleges
    b. Area vocational
4. Apprenticeships
5. Military, private, etc.

Length of Training Activities

1. Twelve months
2. Twenty-four months
3. Two six-week short-courses
4. Part-time
5. Full-time

Source of Finances

1. Public
    a. Local
    b. State
    c. Federal
2. Mixed public and private
3. Private

TABLE 6. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

01.00 Agriculture

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
01	Agricultural Production	181,000	4,500	1,980	130	2,110
02	Agricultural Supplies	7,000	500	290	0	290
03	Agricultural Mechanics	18,000	1,600	840	0	840
04	Agricultural Products	5,000	290	230	0	230
05	Ornamental Horitculture	2,000	150	100	0	100
06	Agricultural Resources	7,000	400	270	0	270
07	Forestry	7,000	600	280	0	280
99	Other	8,000	700	310	0	310
	TOTAL	235,000	8,740	4,300	130	4,430

TABLE 6a. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

04.00 Distributive Education

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
01	Advertising Services	4,200	400	40	40	80
02	Apparel and Accessories	9,500	980	310	110	420
03	Automotive	3,500	360	130	0	130
04	Finance and Credit	3,900	400	170	0	170
05	Floristry	NOT	AVAILABLE	0	0	0
06	Food Distribution	7,000	700	460	0	460
07	Food Services	10,650	1,150	410	20	430
08	General Merchandise	5,940	630	410	0	410
09	Hardware, Equipment	6,120	550	210	0	210
10	Home Furnishings	4,450	470	60	0	60
11	Hotel and Lodging	11,250	1,150	50	40	90
12	Industrial Marketing	3,000	250	170	0	170

TABLE 6b. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

04.00 Distributive Education

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
13	Insurance	6,240	650	20	0	20
14	International Trade	NOT	AVAILABLE	40	0	40
15	Personal Services	25,120	2,250	50	0	50
16	Petroleum	3,500	350	130	0	130
17	Real Estate	1,960	190	10	20	30
18	Recreation and Tourism	NOT	AVAILABLE	0	0	0
19	Transportation	2,000	180	50	100	150
20	Retail Trade, Other	13,570	1,500	680	0	680
31	Wholesale Trade, Other	1,500	150	40	0	40
99	Other	4,000	350	350	0	350
	TOTAL	127,400	12,660	3,690	330	4,120

TABLE 6c. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

07.00 Health Occupations Education

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
01	Dental	890	280	40	140	180
02	Medical Lab Technology	1,070	350	170	130	300
03	Nursing	11,510	4,500	700	330	1,030
04	Rehabilitation	150	120	20	20	40
05	Radiologic	610	150	0	150	150
06	Ophthalmic	50	40	0	0	0
07	Environmental Health	220	190	0	30	30
08	Mental Health Technology	170	60	0	10	10
09	Miscellaneous Health	740	600	10	20	30
99	Other	NOT	AVAILABLE	70	590	660
	TOTAL	15,410	6,290	1,010	1,420	2,430

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TABLE 6d. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

09.00 Home Economics

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
01	Homemaking	N O T	A V A I L A B L E	2,780	0	2,780
02	Occupational Preparation	38,400	2,300	460	0	460
99	Other	1,320	70	10	0	10
	TOTAL	39,720	2,370	3,250	0	3,250

TABLE 6e. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

14.00 Office Occupations

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
01	Accounting	10,980	2,710	850	670	1,520
02	Business Data Processing	2,850	870	360	130	490
03	General Office	23,370	4,120	3,520	860	4,380
04	Information Communication Operations	3,140	1,630	50	850	900
05	Materials Support	160	70	10	10	20
06	Personnel and Training	NOT AVAILABLE	290	30	30	60
07	Secretarial	25,100	7,320	3,730	1,440	5,170
08	Supervisory and Management	2,160	1,910	130	30	160
09	Typing	14,190	3,910	810	320	1,130
99	Other	1,640	490	320	120	440
	TOTAL	83,590	23,320	9,810	4,460	14,270

TABLE 6f. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

16.00 Technical Education

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
01	Engineering Technology	37,400	7,700	740	850	1,590
02	Agricultural Technology	1,610	270	210	40	250
03	Health Technology	680	120	0	0	0
04	Office Technology	400	40	30	0	30
05	Home Economics Technology	NOT	AVAILABLE	0	0	0
06	Miscellaneous Technology	3,390	160	60	80	140
99	Other	4,820	180	20	20	40
	TOTAL	48,300	8,470	1,060	990	2,050

TABLE 6g. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

17.00 Trade and Industry

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Tot[illegible]
01	Air Conditioning	1,480	130	10	120	130
02	Appliance Repair	5,960	150	100	60	160
03	Automotive Services	14,010	240	1,170	320	1,490
04	Aviation Occupations	2,870	450	110	10	120
05	Blueprint Reading	N O T	A V A I L A B L E	0	0	0
06	Business Machine Maintenance	840	50	20	0	2[illegible]
07	Commercial Art	1,700	100	80	50	130
08	Commercial Fisheries	N O T	A V A I L A B L E	0	0	0
09	Commercial Photography	520	30	30	0	30
10	Construction & Maintenance	47,280	1,480	680	750	1,430
11	Custodial Services	20,040	500	70	0	70
12	Diesel Mechanics	1,900	210	200	10	210

TABLE 6h. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

17.00 Trade and Industry

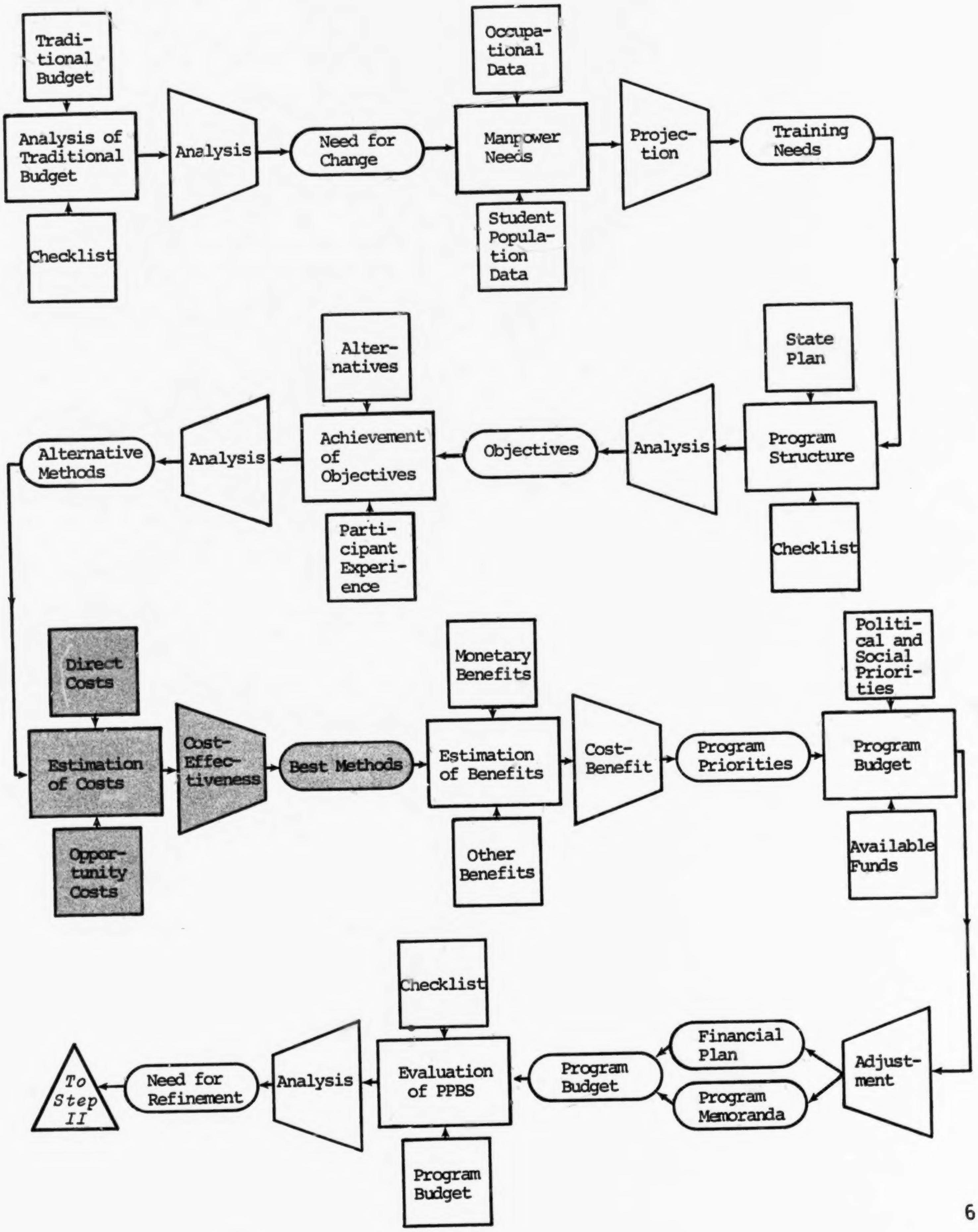
Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
13	Drafting	NOT	AVAILABLE	0	0	0
14	Electrical Occupations	5,830	250	100	180	280
15	Electronics Occupations	6,130	980	60	600	660
16	Fabric Maintenance	5,610	40	0	0	0
17	Foremanship & Management	NOT	AVAILABLE	0	0	0
18	General Continuation	NOT	AVAILABLE	0	0	0
19	Graphic Arts	7,200	180	190	0	190
20	Industrial Atomic Energy	NOT	AVAILABLE	0	0	0
21	Instruments Maintenance	590	30	20	10	30
22	Maritime Occupations	NOT	AVAILABLE	0	0	0
23	Metalworking	29,450	1,980	1,240	270	1,510
24	Metallurgy	2,560	100	60	0	60
25	Nucleonic Occupations	NOT	AVAILABLE	0	0	0

TABLE 6i. SUMMARY OF PRESENT LABOR FORCE REQUIREMENTS AND TRAINED OUTPUT

17.00 Trade and Industry

Instructional or Occupational Areas		Current Employment Year 0	Estimated Labor Force Requirements: Year 0	Training Output: Year 0		
Code	Description			Vocational Education	Other Sectors	Total
26	Personal Services	10,430	790	270	0	270
27	Plastics Occupations	7,840	100	20	0	20
28	Public Services	NOT	AVAILABLE	0	0	0
29	Quantity Food Occupations	18,550	580	380	90	470
30	Refrigeration	NOT	AVAILABLE	0	0	0
31	Small Engine Repair	NOT AVAILABLE	100	160	0	160
32	Stationary Energy Sources	5,280	40	30	0	30
33	Textile Production	NOT AVAILABLE	70	20	0	20
34	Leather Working	400	10	10	0	10
35	Upholstering	890	30	20	10	30
36	Woodworking	330	60	50	10	60
37	Mining and Quarrying	NOT	AVAILABLE	0	0	0
99	Other	11,890	1,210	1,030	260	1,290
	TOTAL	209,610	9,890	6,130	2,750	8,880

SEQUENCE OF STEPS


Traditional Budget
Analysis of Traditional Budget
Checklist
Analysis
Need for Change
Occupational Data
Manpower Needs
Student Population Data
Projection
Training Needs
State Plan
Program Structure
Checklist
Analysis
Objectives
Alternatives
Achievement of Objectives
Participant Experience
Analysis
Alternative Methods
Direct Costs
Estimation of Costs
Opportunity Costs
Cost-Effectiveness
Best Methods
Monetary Benefits
Estimation of Benefits
Other Benefits
Cost-Benefit
Program Priorities
Political and Social Priorities
Program Budget
Available Funds
Adjustment
Financial Plan
Program Memoranda
Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

STEP V. ESTIMATION OF COSTS

Purpose: To estimate the total costs of alternative methods of objective and/or sub-objective achievement and to choose the best method of achieving each objective and/or sub-objective.

Time: Two to four hours.

Materials: 1. Table 7. Summary of Annual Education Costs by Instructional Area.

Procedure:

1. Attach cost data to personnel and facility requirement for each alternative.
2. Estimate opportunity costs of students and include in summation with facility and personnel costs.
3. Choose the best method of achieving each objective.

Forms:

Form J. Costs of Alternatives.

Form K. Summary of Program Element and Sub-element Costs.*

Form L. Summary of Program Category and Element Costs.

References:

1. Abt Associates, Inc., *An Overview of the Cost-Effectiveness Model and Sub-models for the Evaluation of Title I ESEA Proposals*.
2. G. H. Fisher, *The Role of Cost-Utility Analysis in Program Budgeting* (Santa Monica, California: RAND Corporation, 1964).
3. George Washington University, *Planning-Programming-Budgeting for City, State, County Objectives, PPB Note 6: The Role and Nature of Cost Analysis in a PPB System* (Washington, D.C.: George Washington University, 1967).
4. I. Heymont, *Guide for Reviewers of Studies Continuing Cost-Effectiveness Analysis* (McLean, Virginia: 1965).
5. J. D. McCullough, *Cost Analysis for Planning-Programming-Budgeting Cost-Benefit Studies* (California: RAND Corporation, 1966).
6. E. S. Quade, *Cost-Effectiveness Analysis: An Introduction and Overview* (Santa Monica, California: RAND Corporation, 1965).

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*A sub-objective with its best method of achievement will be called a program sub-element; similarly, an objective will be called a program element.

FORM J. COSTS OF ALTERNATIVES

Goal: Objective No. ____________	Years				
	1	2	3	4	5
Sub-objective No. ____________					
Alternative 1 Administration Instruction Equipment Building Foregone Earnings Total	$	$	$	$	$
Alternative 2 Administration Instruction Equipment Building Foregone Earnings Total					
Alternative 3 Administration Instruction Equipment Building Foregone Earnings Total					

FORM K. SUMMARY OF PROGRAM ELEMENT AND SUBELEMENT COSTS

Program Category	Years				
	1	2	3	4	5
Program Element No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Subelement No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Subelement No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Subelement No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Subelement No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$

FORM L. SUMMARY OF PROGRAM CATEGORY AND PROGRAM ELEMENT COSTS

Program Description	Years				
	1	2	3	4	5
Program Category No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Element No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Element No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Element No. ________					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$
Program Element No.					
Output Quantity					
Input Cost	$	$	$	$	$
Cost per Output Unit	$	$	$	$	$

TABLE 7. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

***PERSONNEL*[1]**	
Administrators	
Upper Limit	$18,000
Lower Limit	$12,000
Instructors	
Upper Limit	$12,000
Lower Limit	$ 8,000
Clerical	
Upper Limit	$ 6,000
Lower Limit	$ 4,500
Student Opportunity Costs[2]	
Male	$ 3,000
Female	$ 2,500
***FACILITIES*[3]**	
Classroom Facilities[4]	
Building Space Costs	$ 700
Equipment Costs	$ 100

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[1] Includes all expenses associated with the employment of an individual.

[2] Average foregone earnings of employed labor with no special skills in the 18-25 age group.

[3] Based on a class size of 25 students; costs include annual operating costs (excluding personnel) and amortized capital costs (building costs at $1.00 per square foot and equipment life at five years).

[4] One classroom required per activity (class of 25 students).

TABLE 7a. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

01.00 Agriculture

Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
01	Agricultural Production	$3,000	$3,000
02	Agricultural Supplies		500
03	Agricultural Mechanics	5,000	4,000
04	Agricultural Products		500
05	Ornamental Horticulture	4,000	800
06	Agricultural Resources	1,000	1,600
07	Forestry	1,000	500
99	Agriculture, Other	1,000	1,600

TABLE 7b. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

04.00 Distributive Education

Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
01	Advertising Services	$1,500	$1,600
02	Apparel and Accessories	1,200	1,200
03	Automotive	1,200	1,200
04	Finance & Credit	1,200	1,200
05	Floristry	1,500	1,600
06	Food Distribution	1,200	600
07	Food Services	4,000	7,000
08	General Merchandise	1,200	1,200
09	Hardware, Equipment	1,200	1,200
10	Home Furnishings	3,000	1,600
11	Hotel and Lodging	1,500	1,600
12	Industrial Marketing	1,200	1,200
13	Insurance	1,200	1,200
14	International Trade	1,200	1,200
15	Personal Services	1,200	1,200
16	Petroleum	1,200	1,200
17	Real Estate	1,200	1,200
18	Recreation and Tourism	1,200	1,200
19	Transportation	1,200	1,200
20	Retail Trade, Other	1,200	1,200
31	Wholesale Trades, Other	1,200	1,200
99	Other	1,200	1,200

TABLE 7c. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

07.00 Health Occupations Education

Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
01	Dental	$2,000	$2,000
02	Medical Lab Technology	2,000	1,600
03	Nursing	2,000	2,000
04	Rehabilitation	2,000	1,600
05	Radiologic	2,000	2,400
06	Ophthalmic	2,000	1,200
07	Environmental Health	2,000	800
08	Mental Health Technology	2,000	800
09	Miscellaneous Health	2,000	1,600
99	Other	2,000	1,600

TABLE 7d. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

09.00 Home Economics

Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
01	Homemaking	$2,400	$1,800
02	Occupational Preparation	3,200	1,600
99	Other	2,000	1,600

TABLE 7e. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

14.00 Office Occupations

Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
01	Accounting	$1,200	$4,000
02	Business Data Processing	2,000	15,000
03	General Office	1,400	4,900
04	Information Communication Operator	1,400	2,000
05	Materials Support	1,400	6,000
06	Personnel and Training	1,200	5,600
07	Secretarial	1,400	3,000
08	Supervisory and Management	1,400	2,000
09	Typing	1,400	3,000
99	Other	1,400	3,000

TABLE 7f. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

16.00 Technical Education

Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
01	Engineering Tech.	$2,000	$6,000
02	Ag. Technology	4,000	4,000
03	Health Technology	1,500	3,600
04	Office Technology	1,400	5,000
05	Home Ec. Tech.	4,000	3,000
06	Miscellaneous Technology	2,000	3,000
99	Other	2,000	3,000

TABLE 7g. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

17.00 Trade and Industrial

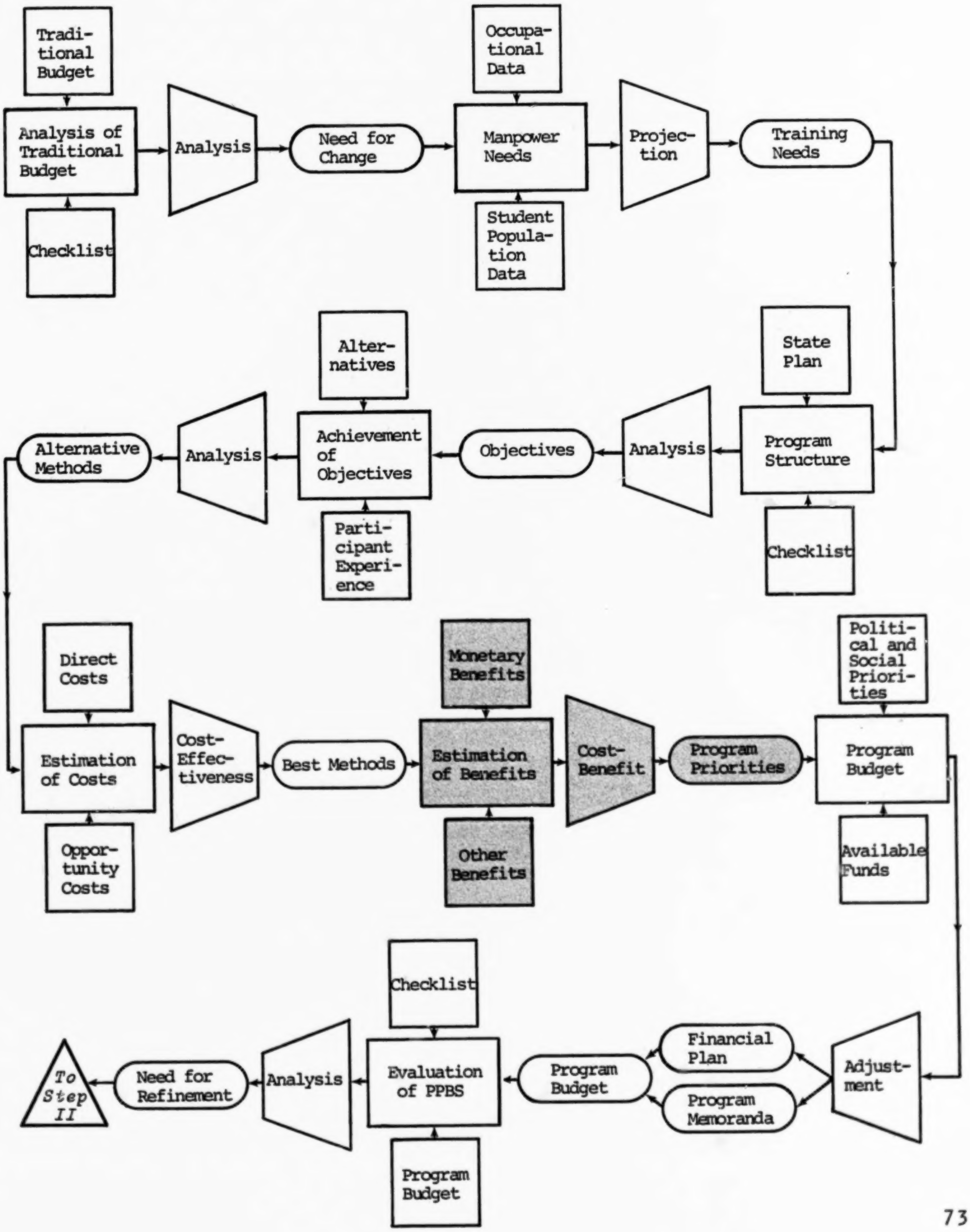
Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
01	Air Conditioning	$4,000	$2,000
02	Appliance Repair	1,600	2,000
03	Automotive Services	5,000	3,200
04	Aviation Occupations	5,000	4,000
05	Blueprint Reading	1,200	800
06	Business Machine Maintenance	1,600	2,000
07	Commercial Art	2,000	1,900
08	Commercial Fisheries	NOT	AVAILABLE
09	Commercial Photography	4,000	1,000
10	Construction & Maintenance	4,000	2,800
11	Custodial Services	1,200	400
12	Diesel Mechanics	3,000	4,000
13	Drafting	2,000	2,000
14	Electrical Occupations	2,400	3,600
15	Electronics Occupations	2,400	16,000
16	Fabric Maintenance	3,000	4,000
17	Foremanship and Management	1,200	800

TABLE 7h. SUMMARY OF ANNUAL EDUCATION COSTS BY INSTRUCTIONAL AREA

17.00 Trade and Industrial

Instructional or Occupational Areas		Building Costs	Equipment Costs
Code	Description		
18	General Continuation	$1,200	$ 800
19	Graphic Arts	3,000	10,000
20	Industrial Atomic Energy	NOT	AVAILABLE
21	Instruments Maintenance	1,800	3,000
22	Maritime Occupations	NOT	AVAILABLE
23	Metalworking	4,000	40,000
24	Metallurgy	3,000	3,600
25	Nucleonic Occupations	NOT	AVAILABLE
26	Personal Services	2,000	2,500
27	Plastics Occupations	2,500	4,800
28	Public Services	1,200	2,000
29	Quantity Food Occupations	4,000	7,000
30	Refrigeration	1,800	2,000
31	Small Engine Repair	2,400	1,600
32	Stationary Energy Sources	3,000	3,600
33	Textile Production	1,800	2,000
34	Leather Working	1,200	1,600
35	Upholstering	1,800	1,600
36	Woodworking	2,000	1,200
37	Mining and Quarrying	3,000	5,000
99	Other	2,500	3,000

SEQUENCE OF STEPS


Traditional Budget
Analysis of Traditional Budget
Checklist
Analysis
Need for Change
Occupational Data
Manpower Needs
Student Population Data
Projection
Training Needs
State Plan
Program Structure
Checklist
Analysis
Objectives
Alternatives
Achievement of Objectives
Participant Experience
Analysis
Alternative Methods
Direct Costs
Estimation of Costs
Opportunity Costs
Cost-Effectiveness
Best Methods
Monetary Benefits
Estimation of Benefits
Other Benefits
Cost-Benefit
Program Priorities
Political and Social Priorities
Program Budget
Available Funds
Adjustment
Financial Plan
Program Memoranda
Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

STEP VI. ESTIMATION OF BENEFITS

Purpose: To estimate the monetary and non-monetary benefits of each sub-program and to rank programs on the basis of net benefits.

Time: Two to four hours.

Materials: Appendix D. A Benefit-Cost Problem.

Table 8. Summary of the Monetary Benefits of Education.

Table 9. Summary of Data for Estimation of Lifetime Monetary Benefits.

Procedure:

1. Optional: Complete and analyze Benefit-Cost Problem.
2. Compute change in present value of lifetime earnings per graduate due to the vocational program element using a discount rate of five percent.
3. Do either (a) and/or (b) for each student:
    - a. Subtract total cost of program element from change in present value of lifetime earnings (net benefits).
    - b. Divide the change in present value of lifetime earnings by total cost of program element (benefit-cost ratio).
4. Compute net benefits or benefit-cost ratio of each program element over five years.
5. Rank program elements on the basis of highest benefit-cost ratio or net benefits.
6. Identify any non-monetary benefits which are unique to specific program elements.
7. Optional: Go through procedure using a discount rate of eight percent.

Forms: Form M. Average Annual Net Benefits Per Graduate.

Form N. Net Benefits of Program: Element and Sub-elements.

Form O. Net Benefits of Program: Category and Elements.

References:

1. William J. Baumol, "On the Social Rate of Discount," *The American Economic Review* (September 1968).

2. Adgar B. Carroll and Loren A. Ihnen, *Costs and Returns for Investments in Technical Schooling by a Group of North Carolina High School Graduates* (Raleigh, North Carolina: North Carolina State University, 1967).

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5. D. G. Quiren, *The Capital Expenditure Decision* (Irwin, Inc., 1967).

6. T. W. Schultz, *The Economic Value of Education* (New York: Columbia University Press, 1963).

7. J. Robert Warmbrod, *Review and Synthesis of Research on the Economics of Vocational-Technical Education* (Columbus: The Center for Vocational and Technical Education, The Ohio State Unviersity, 1968).

8. B. A. Weisbrod, *External Benefits of Public Education: An Economic Analysis* (Princeton, New Jersey: Princeton University Press, 1964).

FORM M. AVERAGE ANNUAL NET BENEFITS PER GRADUATE

Program Category	Unique Non-monetary Benefits**	Present Value of Lifetime Earnings of Program	Opportunity Cost: Present Value of Lifetime Earnings*	Net Present Value of Program	Total Cost of Program	Net Benefits of Program	Benefit-Cost Ratio
Program Element No.__________	1. 2. 3.	$	$	$	$	$	
Program Subelement No.__________	1. 2. 3.						
Program Subelement No.__________	1. 2. 3.						
Program Subelement No.__________	1. 2. 3.						
Program Subelement No.__________	1. 2. 3.						
Program Subelement No.__________	1. 2. 3.						
Program Subelement No.__________	1. 2. 3.						
Program Subelement No.__________	1. 2. 3.						

*Present value of lifetime earnings of dropouts or nonvocational graduates.

**Use additional pages to describe unique non-monetary benefits.

FORM N. NET BENEFITS OF PROGRAM ELEMENTS AND SUBELEMENTS

Program Category:	Rank	Unique Non-monetary Benefits **	Net Benefits or Benefit-Cost Ratio of Program (Years)				
			1	2	3	4	5
Program Element No.________		1. 2. 3.					
Program Subelement No.________		1. 2. 3.					
Program Subelement No.________		1. 2. 3.					
Program Subelement No.________		1. 2. 3.					
Program Subelement No.________		1. 2. 3.					
Program Subelement No.________		1. 2. 3.					
Program Subelement No.________		1. 2. 3.					
Program Subelement No.________		1. 2. 3.					

**Use additional pages to describe unique non-monetary benefits.

FORM O. NET BENEFITS OF PROGRAM CATEGORY AND ELEMENTS

Description	Rank	Unique Non-monetary Benefits**	Net Benefits or Benefit-Cost Ratio of Program (Years)				
			1	2	3	4	5
Program Category No.____________		1. 2. 3.					
Program Element No.____________		1. 2. 3.					
Program Element No.____________		1. 2. 3.					
Program Element No.____________		1. 2. 3.					
Program Element No.____________		1. 2. 3.					
Program Element No.____________		1. 2. 3.					
Program Element No.____________		1. 2. 3.					
Program Element No.____________		1. 2. 3.					
**Use additional pages to describe unique non-monetary benefits.							

TABLE 8. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

01.00 Agriculture

Code	Occupational or Instructional Area	Entry-Level Annual Salary	Average Present Value of Lifetime Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
01	Agricultural Production	$5,000	$120,400	$111,800	$83,300	$77,350
02	Agricultural Supplies	5,500	132,440	122,980	91,630	85,080
03	Agricultural Mechanics	5,500	113,520	108,790	78,540	75,270
04	Agricultural Products	6,000	144,480	134,160	99,960	92,820
05	Ornamental Horticulture	6,500	156,520	145,340	108,290	100,560
06	Agricultural Resources	6,000	123,840	118,680	85,680	82,110
07	Forestry	6,000	123,840	118,680	85,680	82,110
99	Other	5,500	113,520	108,790	78,540	75,270

TABLE 8a. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

04.00 Distributive Education

Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Lifetime Earnings (Discount Rate)			
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
			5%		8%	
01	Advertising Services	$5,000	$120,400	$111,800	$83,300	$77,350
02	Apparel and Accessories	4,000	82,560	79,120	57,120	54,740
03	Automotive	5,000	103,200	98,900	71,400	68,420
04	Finance and Credit	4,500	108,360	100,620	74,970	69,620
05	Floristry	4,500	108,360	100,620	74,970	69,620
06	Food Distribution	4,000	82,560	79,120	57,120	54,740
07	Food Services	3,500	72,240	69,230	49,980	47,900
08	General Merchandise	4,500	92,880	89,010	64,260	61,580
09	Hardware, Equipment	4,500	92,880	89,010	64,260	61,580
10	Home Furnishings	4,500	108,360	100,620	74,970	69,620
11	Hotel and Lodging	4,500	108,360	100,620	74,970	69,620

TABLE 8b. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

04.00 Distributive Education

Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Life-time Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
12	Industrial Marketing	$6,500	$156,520	$145,340	$108,290	$100,560
13	Insurance	5,500	132,440	122,980	91,630	85,080
14	International Trade	5,000	120,400	111,800	83,300	77,350
15	Personal Services	4,000	82,560	79,120	57,120	54,740
16	Petroleum	4,000	82,560	79,120	57,120	54,740
17	Real Estate	5,000	120,400	111,800	83,300	77,350
18	Recreation and Tourism	6,000	144,480	134,160	99,960	92,820
19	Transportation	4,500	92,880	89,010	64,260	61,580
20	Retail Trade, Other	4,500	92,880	89,010	64,260	61,580
31	Wholesale Trade, Other	5,000	120,400	111,800	83,300	77,350
99	Other	4,500	92,880	89,010	64,260	61,580

TABLE 8c. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

07.00 Health Occupations

Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Lifetime Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
01	Dental	$5,000	$103,200	$98,900	$71,400	$68,420
02	Medical Lab Technology	6,500	156,520	145,340	108,290	100,560
03	Nursing	4,500	92,880	89,010	64,260	61,580
04	Rehabilitation	5,500	113,520	108,790	78,540	75,270
05	Radiologic	5,500	113,520	108,790	78,540	75,270
06	Ophthalmic	5,000	103,200	98,900	71,400	68,420
07	Environmental Health	5,500	132,440	122,980	91,630	85,080
08	Mental Health Technology	5,500	132,440	122,980	91,630	85,080
09	Miscellaneous Health	5,000	103,200	98,900	71,400	68,420
99	Other	5,000	103,200	98,900	71,400	68,420

TABLE 8d. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

09.00 Home Economics

Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Lifetime Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
01	Homemaking	(NA)	$	$	$	$
02	Occupational Preparation	$4,500	$92,880	$89,010	$64,260	$61,580
99	Other	4,000	82,560	79,120	57,120	54,740

TABLE 8e. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

14.00 Office Occupations

Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Life-time Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
01	Accounting	$5,000	$103,200	$98,900	$71,400	$68,420
02	Business Data Processing	4,000	96,320	89,440	66,640	61,880
03	Office Clerical	3,500	72,240	69,230	49,980	47,900
04	Information Communications Operations	6,500	156,520	145,340	108,290	100,560
05	Materials Support	4,500	108,360	100,620	74,970	69,620
06	Personnel, Training	7,000	168,560	156,520	116,620	108,290
07	Secretarial	4,000	82,560	79,120	57,120	54,740
08	Supervisory and Management	6,000	144,480	134,160	99,960	92,820
09	Typing	3,500	72,240	69,230	49,980	47,900
99	Other	4,500	108,360	100,620	74,970	69,620

TABLE 8f. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

16.00 Technical Education

Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Lifetime Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
01	Engineering Technology	$6,000	$144,480	$134,160	$99,960	$92,820
02	Agricultural Technology	6,500	134,160	128,570	92,820	88,950
03	Health Technology	7,000	168,560	156,520	116,620	108,290
04	Office Technology	6,000	144,480	134,160	99,960	92,820
05	Home Economics Technology	5,500	113,520	108,790	78,540	75,270
06	Miscellaneous Technology	6,000	144,480	134,160	99,960	92,820
99	Other	6,000	144,480	134,160	99,960	92,820

TABLE 8g. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

17.00 Trade and Industry

Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Life-time Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
01	Air Conditioning	$6,000	$123,840	$118,680	$85,680	$82,110
02	Appliance Repair	5,500	113,520	108,790	78,540	75,270
03	Automotive Services	5,500	113,520	108,790	78,540	75,270
04	Aviation	6,000	144,480	134,160	99,960	92,820
05	Blueprint Reading	4,500	92,880	89,010	64,260	61,580
06	Business Machine Maintenance	6,000	123,840	118,680	85,680	82,110
07	Commercial Art	6,500	156,520	145,340	108,290	100,560
08	Commercial Fishery	5,000	103,200	98,900	71,400	68,420
09	Commercial Photography	5,500	132,440	122,980	91,630	85,080
10	Construction and Maintenance	6,000	123,840	118,680	85,680	82,110
11	Custodial Services	3,500	72,240	69,230	49,980	47,900
12	Diesel Mechanics	6,500	134,160	128,570	92,820	88,950
13	Drafting	6,000	144,480	134,160	99,960	92,820
14	Electrical Occupations	6,000	144,480	134,160	99,960	92,820
15	Electronic Occupations	7,000	168,560	156,520	116,620	108,290
16	Fabric Maintenance	3,500	72,240	69,230	49,980	47,900
17	Foremanship and Supervision	6,000	144,480	134,160	99,960	92,820
18	General Continuation	5,000	103,200	98,900	71,400	68,420
19	Graphic Arts	6,500	156,520	145,340	108,290	100,560

TABLE 8h. SUMMARY OF THE MONETARY BENEFITS OF EDUCATION

17.00 Trade and Industry

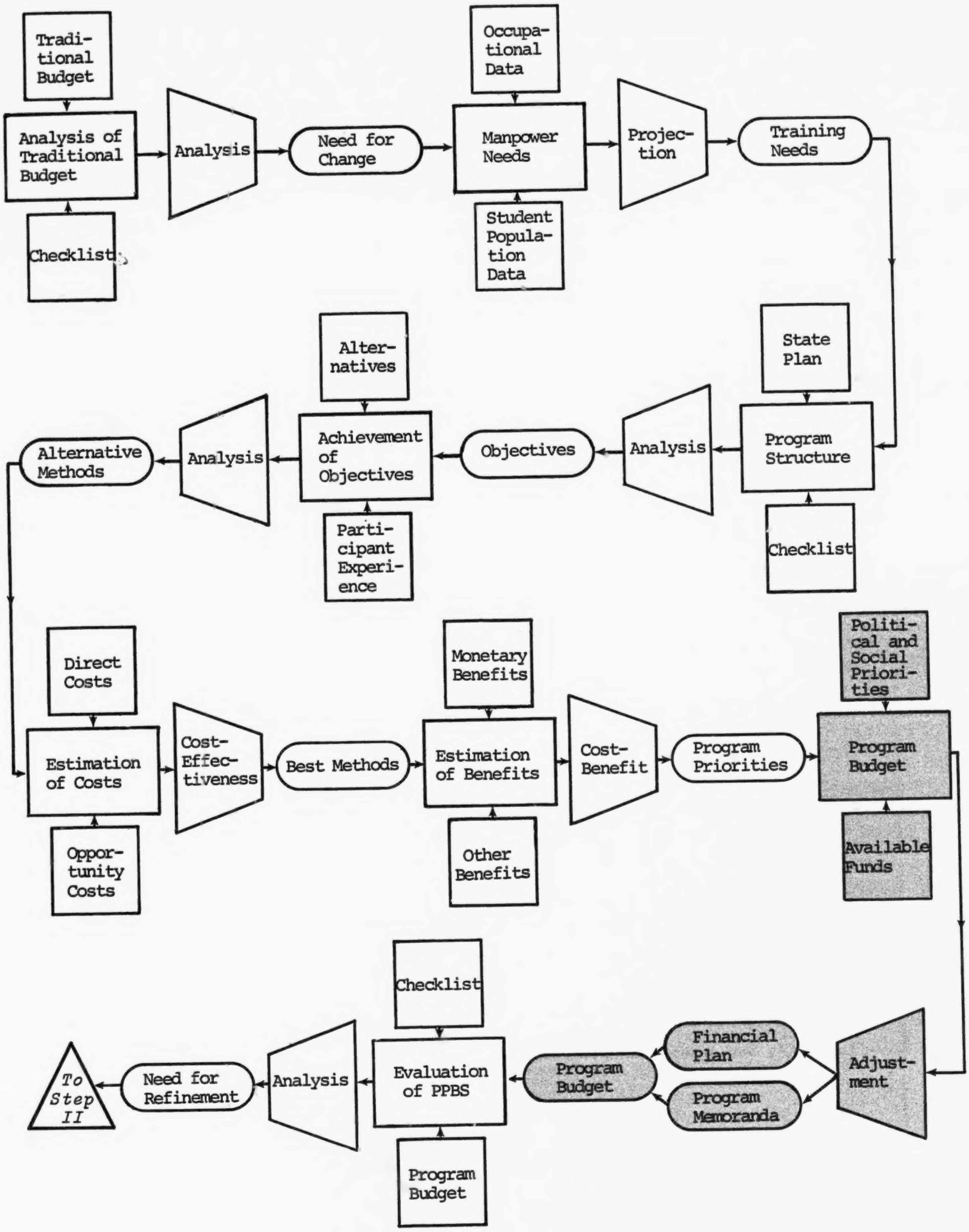
Code	Instructional or Occupational Area	Entry-Level Annual Salary	Average Present Value of Lifetime Earnings (Discount Rate)			
			5%		8%	
			40 Yr.	30 Yr.	40 Yr.	30 Yr.
20	Industrial Atomic Energy	$7,500	$180,600	$167,700	$124,950	$116,020
21	Instruments Maintenance	7,000	168,560	156,520	116,620	108,290
22	Maritime Occupations	6,500	134,160	128,570	92,820	88,950
23	Metal Working	7,000	168,560	156,520	116,620	108,290
24	Metallurgy	6,500	134,160	128,570	92,820	88,950
25	Nucleonic Occupations	7,500	180,600	167,700	124,950	116,020
26	Personal Services	6,000	144,480	134,160	99,960	92,820
27	Plastics	6,000	144,480	134,160	99,960	92,820
28	Public Services	5,000	103,200	98,900	71,400	68,420
29	Quantity Food	6,000	123,840	118,680	85,680	82,110
30	Refrigeration	6,000	123,840	118,680	85,680	82,110
31	Small Engine Repair	5,000	103,200	98,900	71,400	68,420
32	Stationary Energy Sources	5,500	132,440	122,980	91,630	85,080
33	Textile Production	4,500	92,880	89,010	64,260	61,580
34	Leather Working	5,500	113,520	108,790	78,540	75,270
35	Upholstering	5,500	113,520	108,790	78,540	75,270
36	Woodworking	5,500	113,520	108,790	78,540	75,270
37	Mining and Quarrying	5,500	113,520	108,790	78,540	75,270
99	Other	5,500	132,440	122,980	91,630	85,080

TABLE 9. SUMMARY OF DATA FOR ESTIMATION OF LIFETIME MONETARY BENEFITS

Base Salary	Net Present Value at Discount Rate of 5%				Net Present Value at Discount Rate of 8%			
	Working Life = 40 Yr.		Working Life = 30 Yr.		Working Life = 40 Yr.		Working Life = 30 Yr.	
	Annual Increase (1%)*	Annual Increase (2%)	Annual Increase (1%)	Annual Increase (2%)	Annual Increase (1%)	Annual Increase (2%)	Annual Increase (1%)	Annual Increase (2%)
	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)
$2,500	$ 51.60	$ 60.20	$ 49.45	$ 55.90	$ 35.70	$ 41.65	$ 34.12	$ 38.68
3,000	61.92	72.24	59.34	67.08	42.84	49.98	41.06	46.41
3,500	72.24	84.28	69.23	78.26	49.98	58.31	47.90	54.14
4,000	82.56	96.32	79.12	89.44	57.12	66.64	54.74	61.88
4,500	92.88	108.36	89.01	100.62	64.26	74.97	61.58	69.62
5,000	103.20	120.40	98.90	111.80	71.40	83.30	68.42	77.35
5,500	113.52	132.44	108.79	122.98	78.54	91.63	75.27	85.08
6,000	123.84	144.48	118.68	134.16	85.68	99.96	82.11	92.82
6,500	134.16	156.52	128.57	145.34	92.82	108.29	88.95	100.56
7,000	144.48	168.56	138.46	156.52	99.96	116.62	95.79	108.29
7,500	154.80	180.60	148.35	167.70	107.10	124.95	102.64	116.02
8,000	165.12	192.64	158.24	178.88	114.24	133.28	109.48	123.76
8,500	175.44	204.68	168.13	190.06	121.38	141.61	116.32	131.49
9,000	185.76	216.72	178.02	201.24	128.52	149.94	123.16	139.23
9,500	196.08	228.76	187.91	212.42	135.66	158.27	130.01	135.06
10,000	206.40	240.80	197.80	223.60	142.80	166.60	136.85	154.70

*Annual increase is computed as a constant percentage of base salary.

SEQUENCE OF STEPS


Traditional Budget
Analysis of Traditional Budget
Checklist
Analysis
Need for Change
Occupational Data
Manpower Needs
Student Population Data
Projection
Training Needs
State Plan
Program Structure
Checklist
Analysis
Objectives
Alternatives
Achievement of Objectives
Participant Experience
Analysis
Alternative Methods
Direct Costs
Estimation of Costs
Opportunity Costs
Cost-Effectiveness
Best Methods
Monetary Benefits
Estimation of Benefits
Other Benefits
Cost-Benefit
Program Priorities
Political and Social Priorities
Program Budget
Available Funds
Adjustment
Financial Plan
Program Memoranda
Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

STEP VII. THE PROGRAM BUDGET

Purpose: To formulate a final program budget for consideration by funding authorities.

Time: Four to six hours.

Materials:
1. All information used or developed in Steps II through VI by all groups.
2. Table 10. Federal, State and Local Expenditures for Vocational Education.

Procedure:
1. Combine all program elements and categories to compute potential total costs of vocational education. (Do not include opportunity costs.)
2. Given the quantity of federal funds available and previous state and local expenditures, compare potential vocational education expenditures with potential funds and if expenditures exceed funds, consider the following alternatives:
    - a. eliminating programs and/or sub-programs.
    - b. reducing the size of programs and/or sub-programs.
    - c. increasing the amount of available funds, identifying the sources of additional funds and justifying the increase.
    - d. some combination of the preceding or other alternatives.
3. Combine all feasible and desirable program elements and program subelements into a final Program Budget for the State Division of Vocational Education, Forms V, T, S, R, Q, and P.
4. If further explanation of specific issues, problems, rationale, or analysis of programs is needed, include as descriptive material in Program Memoranda, Form U.
5. Combine all material into an integrated Program Budget, including Program Memoranda and Analysis, Forms U and B through O, in an appendix.

Forms: Form P. Budget for SDVE: Summary of Program Subelements.

Form Q. Budget for SDVE: Summary of Program Elements.

Form R. Budget for SDVE: Summary of Program Categories.

Form S. Summary of Program Costs by Category and Item.

Form T. Summary of Needed Funds by Category and Source.

Form U. Program Memoranda.

Form V. Title Page.

References:

1. Dade County Board of Public Instruction, *A Program Budget Research Proposal* (Miami: The Board, 1966).

2. George Washington University, *Planning-Programming-Budgeting for City, State, County Objectives, PPB Note 8: The Multi-Year Program and Financial Plan* (Washington, D.C.: George Washington University, 1967).

3. State of California, Department of Finance Management, *Programming and Budgeting System--Program Budget Format*, Memo No. 66-31 (Sacramento, California: Department of Finance Management, 1966).

4. *Program Review--Area Vocational, Technical and Adult Education, District 13* (Wisconsin: Northeast Wisconsin Technical Institute, 1968).

5. State of New York, Executive Department, Office of Planning Coordination, Divison of the Budget, *Guidelines for Integrated Planning, Programming, Budgeting, 1966, 1967, 1968.*

6. U. S. Department of Health, Education, and Welfare, *Planning-Programming-Budgeting: Guidance for Program and Financial Plan* (Washington, D. C.: U. S. Government Printing Office, 1967).

FORM P. BUDGET FOR SDVE: SUMMARY OF PROGRAM SUBELEMENTS

Program Category	Unique Non-monetary Benefits**	Monetary Costs and Benefits per Year									
		Year 1		Year 2		Year 3		Year 4		Year 5	
		Costs	Benefits	Costs	Benefits	Costs	Benefits	Costs	Benefits	Costs	Benefits
Program Element No.____	1. 2. 3.										
Program Subelement No.________	1. 2. 3.										
Program Subelement No.________	1. 2. 3.										
Program Subelement No.________	1. 2. 3.										
Program Subelement No.________	1. 2. 3.										
Program Subelement No.________	1. 2. 3.										

**Use additional pages to describe unique non-monetary benefits.

FORM Q. BUDGET FOR SDVE: SUMMARY OF PROGRAM ELEMENTS

Program Category	Unique Non-monetary Benefits**	Monetary Costs and Benefits per Year									
		Year 1		Year 2		Year 3		Year 4		Year 5	
		Costs	Benefits	Costs	Benefits	Costs	Benefits	Costs	Benefits	Costs	Benefits
Program Element No.____	1. 2. 3.										
Program Element No.____	1. 2. 3.										
Program Element No.____	1. 2. 3.										
Program Element No.____	1. 2. 3.										
Program Element No.____	1. 2. 3.										
Program Element No.____	1. 2. 3.										
**Use additional pages to describe unique non-monetary benefits.											

FORM R. BUDGET FOR SDVE: SUMMARY OF PROGRAM CATEGORIES

Program Description	Unique Non-monetary Benefits **	Monetary Costs and Benefits per Year									
		Year 1		Year 2		Year 3		Year 4		Year 5	
		Costs	Bene-fits	Costs	Bene-fits	Costs	Bene-fits	Costs	Bene-fits	Costs	Bene-fits
Program Category No.____	1. 2. 3.										
Program Category No.____	1. 2. 3.										
Program Category No.____	1. 2. 3.										
Program Category No.____	1. 2. 3.										
Program Category No.____	1. 2. 3.										
Program Category No.____	1. 2. 3.										

**Use additional pages to describe unique non-monetary benefits.

FORM S. SUMMARY OF PROGRAM COSTS BY CATEGORY AND ITEM

Description	Costs	Years				
		1	2	3	4	5
Program Category No.______	Administration					
	Instruction					
	Equipment					
	Buildings					
Program Category No.______	Administration					
	Instruction					
	Equipment					
	Buildings					
Program Category No.______	Administration					
	Instruction					
	Equipment					
	Buildings					
Program Category No.______	Administration					
	Instruction					
	Equipment					
	Buildings					
Total Costs	Administration					
	Instruction					
	Equipment					
	Buildings					

FORM T. SUMMARY OF NEEDED FUNDS BY CATEGORY AND SOURCE

Program Category Description	Fiscal Year	Program Category Size: Students or Graduates	Estimated Total Funds Needed			
			Federal Funds	State Funds	Local Funds	Total Funds
	1					
	2					
	3					
	4					
	5					
	1					
	2					
	3					
	4					
	5					
	1					
	2					
	3					
	4					
	5					
	1					
	2					
	3					
	4					
	5					
	1					
	2					
	3					
	4					
	5					
	1					
	2					
	3					
	4					
	5					
TOTAL	1					
	2					
	3					
	4					
	5					

FORM U. PROGRAM MEMORANDA

Program Category No.________________

Program Element No.________________

FORM V. TITLE PAGE

PROGRAM BUDGET
for the
STATE DIVISION
of
VOCATIONAL EDUCATION

Date:

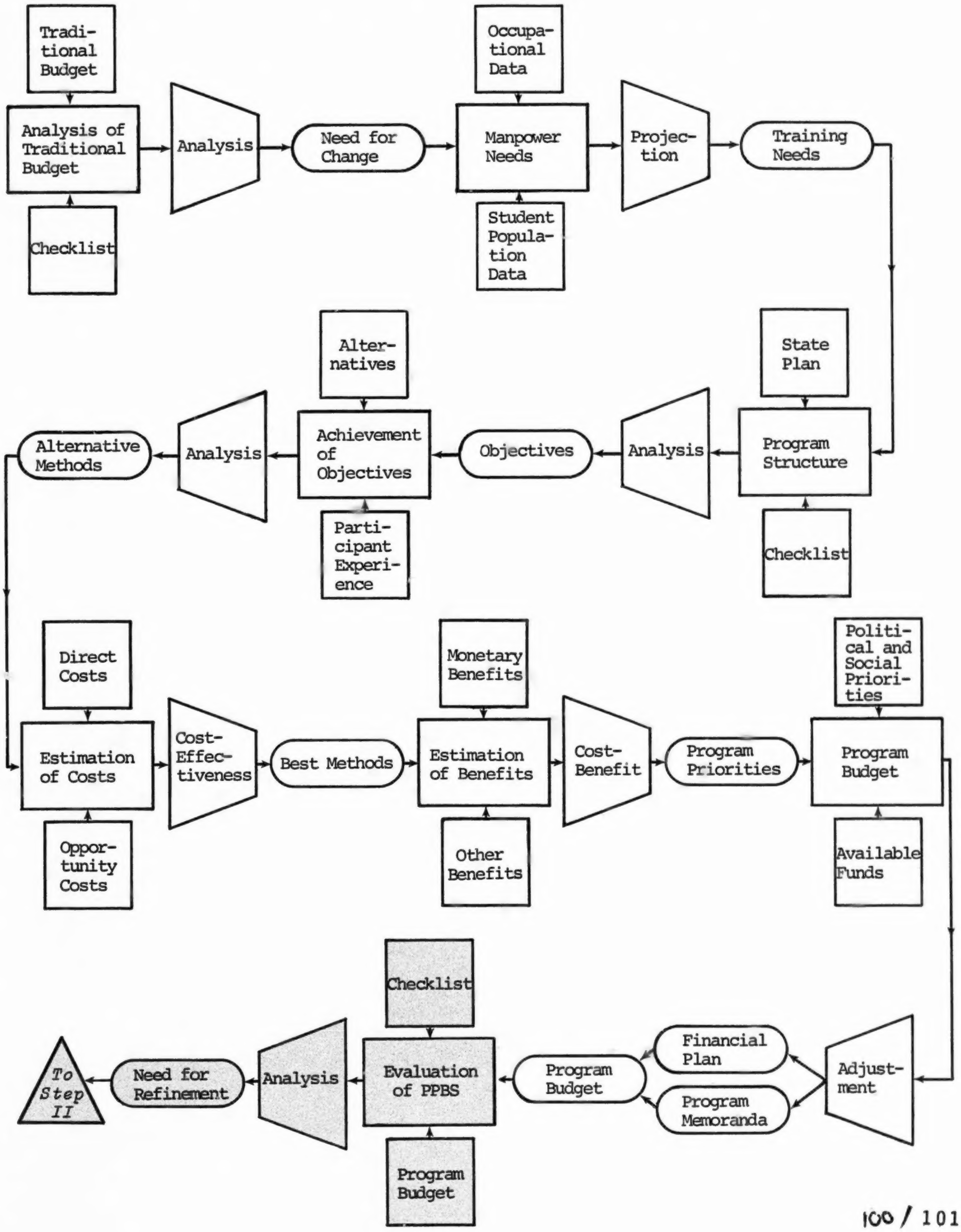
Location:

Submitted by:

TABLE 10. FEDERAL, STATE AND LOCAL EXPENDITURES FOR VOCATIONAL EDUCATION

Year	Total Enrollment	Federal	State	Local	Total
-5	69,827	$162,000	$1,450,000	$13,750,000	$15,362,000
-4	74,263	745,000	3,170,000	14,650,000	18,565,000
-3	81,079	1,200,000	4,500,000	16,190,000	21,890,000
-2	88,934	2,170,000	6,140,000	17,480,000	25,790,000
-1	100,166	3,220,000	7,920,000	18,910,000	30,050,000
0	112,220	4,350,000	9,725,000	20,150,000	34,225,000
1		5,500,000			
2		7,500,000			
3		9,050,000			
4		14,500,000			
5		20,320,000			

SEQUENCE OF STEPS


Traditional Budget
Analysis of Traditional Budget
Checklist
Analysis
Need for Change
Occupational Data
Manpower Needs
Student Population Data
Projection
Training Needs
State Plan
Program Structure
Checklist
Analysis
Objectives
Alternatives
Achievement of Objectives
Participant Experience
Analysis
Alternative Methods
Direct Costs
Estimation of Costs
Opportunity Costs
Cost-Effectiveness
Best Methods
Monetary Benefits
Estimation of Benefits
Other Benefits
Cost-Benefit
Program Priorities
Political and Social Priorities
Program Budget
Available Funds
Adjustment
Financial Plan
Program Memoranda
Program Budget
Checklist
Evaluation of PPBS
Program Budget
Analysis
Need for Refinement
To Step II

STEP VIII. EVALUATION OF PPBS

Purpose: To evaluate and review the PPB System with respect to output and procedures.

Time: Two to four hours.

Materials:
1. All information used or developed in Steps I through VII.
2. Appendix C Program Evaluation Checklist.

Procedure:
1. Evaluate the output and procedure of the PPBS by means of the Program Evaluation Checklist.
2. Evaluate the PPB System with respect to organizational and institutional factors.
3. Evaluate the PPB System with respect to the political processes at local, state, and federal levels.

Forms: None.

References:

1. George Washington University, *Planning-Programming-Budgeting for City, State, County Objectives. PPB Note 2: Administrative Framework for Establishing Planning-Programming-Budgeting Systems in States, Cities and Counties: Some Considerations and Suggested Possibilities* (Washington, D. C.: 1967).
2. George Washington University, *Planning-Programming-Budgeting for City, State, County Objectives, PPB Note 4: Staffing and Training for a PPB System in State and Local Governments* (Washington, D. C.: George Washington University, 1967).
3. Hal Hovey, *The Planning, Programming, Budgeting Approach to Governmental Decision Making* (New York: Frederick A. Praeger, 1968).
4. Public Administration Review Reprint, *Planning-Programming-Budgeting System: A Symposium*, Vol. XXVI, No. 4 (Washington, D. C.: Public Administration Review, 1966).
5. Subcommittee on National Security and International Operations, *PPB, Selected Comment* (Washington, D. C.: 1967).
6. Aaron Wildavsky, *The Politics of the Budgetary Process* (Boston: Little, Brown & Co., 1964).

GLOSSARY

The Planning-Programming-Budgeting System

The Planning-Programming-Budgeting System (PPBS) represents an effort to prepare budgets in such a systematic way as to make them most useful in establishing priorities, in forward planning, in choosing between programs, and in measuring costs against meaningful performance yardsticks.

In essence, PPB calls for:

1. Designing for each government agency an output-oriented program structure under which data on all operations and activities can be presented in categories that reflect the agency's purpose or objectives.

2. Making analyses, in terms of costs and benefits, of possible alternative objectives of an agency and of alternative programs for meeting those objectives.

3. Translating decisions on programs to be carried out into financial budgets for consideration and action by the chief executive and the legislature with subsequent devising of operating budgets for management control purposes.

In general, there are a number of direct benefits which can be expected to emerge from the adoption of this system. These benefits are those that will result from:

1. The disciplines of long-range planning.

2. Documented analyses of alternate courses of action.

3. More systematic consideration of ways and means of accomplishing the purposes for which government agencies exist.

4. Better decision-making processes as to the use of the resources that governments can command.

PPB involves selecting long-range objectives, deciding on specific courses of action to be followed, and translating, planning and programming decisions into specific financial plans for relatively short periods of time. To accomplish its objectives, PPBS requires orderly procedures for handling multi-year inputs and outputs (costs and benefits) of programs. Its usefulness depends, in part, upon the existence of an analytical capability for systematically examining the resource implications of programs and for selecting the least-cost means of achieving program objectives.

Activity

A program category expresses the purpose of a program; activity is a term which is sometimes used to refer to a way in which the purpose may be accomplished. For example, research and development, standards and regulation, distribution of information, and training of personnel, may be activities applicable to a particular agency program.

Alternatives

Within any one agency, this term means other possible programs besides those already decided upon. It suggests a comparison of two or more programs (i.e., two or more possible approaches) toward fulfilling the same objective. Used in this context the term is output-oriented; it suggests substituting an entirely different program (and therefore a different output or outputs) for a program already planned or in process. On the other hand, alternative ways to do a given job takes the program as given, and raises possibilities for changing the mix of inputs. Various means by which objectives can be attained.

Benefit-Cost Ratio

An economic indicator of efficiency, computed by dividing benefits by costs. Usually, both the annualized benefit stream and the cost stream are discounted so that the ratio reflects efficiency in terms of the present value of future benefits and costs.

Budgeting

Budgeting is the process of translating planning and programming decisions into specific projected financial plans for relatively short periods of time. Budgets are short-range segments of action programs adopted which set out planned accomplishments and estimate the resources to be applied for the budget periods in order to attain those accomplishments.

Budget

A financial plan serving as a pattern for and control over future operations; hence, any estimate of future costs; any systematic plan for the utilization of manpower, material, or other resources. The term "budget" also refers to the summary totals of appropriation, receipts, expenditures (excluding net lending), expenditure account surplus or deficit, gross and net lending, total expenditures, and total budget surplus or deficit. A plan for the accomplishment of goals within a definite time period including an estimate of resources required together with an estimate of resources available usually compared with one or more past periods.

Cost-Benefit Analysis (Benefit-Cost Analysis)

An analytical approach to solving problems of choice which requires the definition of objective and identification of the alternative that yields the greatest benefits for any given cost, or what amounts to the same thing, that yields a required or chosen amount of benefits for the least cost. The term usually applies to situations in which the alternative outputs can be quantified in dollars. A chief characteristic of cost-benefit analysis is that its aim is to calculate the present value of benefits and costs, subject to specified constraints. See also: Cost-Effectiveness Analysis.

Cost-Effectiveness Analysis

An analytical approach to solving problems of choice which requires the definition of objectives, identification of alternative ways of achieving the objective, and identification of the alternative that yields the greatest effectiveness for any given cost, or what amounts to the same thing, that yields a required or chosen degree of effectiveness for the least cost. The term is usually used in situations in which the alternative outputs cannot be easily quantified in dollars. See also: Cost-Benefit Analysis.

Costs

Specific resources (inputs) required to achieve a given output.

Criteria

Premises on which priorities are established among alternatives in order to measure relative degrees of desirability. Predetermined rules or standards for ranking alternatives in order of desirability to facilitate and expedite the decision-making process.

Crosswalk

The expression of the relationships between the program structure and the appropriation/budget structure. A crosswalk can be viewed as a table, the stub (rows) of which lists program categories and the columns of which show appropriations and budget activities.

Decision Variable

A variable over which one can exert some control, whose value one can choose as a result of a decision. The decision variable might be the amount of food one must eat to satisfy hunger. If the relationship between the values of the decision variable and the level of goal attainment can be defined, one can then find the value of the decision variable that maximizes the attainment of the goal.

Depreciation

Depreciation is a reduction in the value of assets, usually because of wear, aging, obsolescence, etc. Depreciation accounting is a system of accounting which aims to distribute in a systematic and rational manner the cost or other recorded value of tangible capital assets, less salvage value, over the estimated useful life of the assets. Such accounting is a process of allocation, not of valuation.

Economic Efficiency

That mix of alternative factors of production (resources, activities, programs, etc.) which results in maximum outputs, benefits, or utility for a given cost; alternatively, it represents the minimum cost at which a specified level of output can be maintained.

Economic Good

A physical object which is both useful, in the sense that it satisfies a want or need, and relatively scarce. Both qualities are necessary. Air, while useful, is not scarce, and is not an economic good. See also: Free Good.

Effectiveness

The performance or output received from an approach or a program. Ideally, it is a quantitative measure which can be used to evaluate the level of performance in relation to some standard, set of criteria, or end objective.

Goals

Goals are the long-range accomplishments towards which the agencies' efforts are directed in fulfillment of the mission. They are not necessarily quantitative or set time limits. They correspond to program categories or subcategories.

Inputs

Resources utilized to achieve selected outputs, i.e., to accomplish an effort (program) and includes money, manpower, land, material, equipment, and other resources.

Incremental Cost

In incremental analysis, the total cost associated with a significant change in the level or output.

Internal Rate of Return

The interest rate which, when used to discount future costs and benefits to the present, results in an equality of costs and benefits.

Proposed public investment projects may be ranked by their internal rate of return (IRR) for decision-making purposes provided the projects are not mutually exclusive. Ranking projects in this manner implies that funds produced by the projects are reinvested at the IRR. The IRR must be compared with some minimum discount or interest rate before a decision to invest or not to invest can be made. The IRR is also referred to as the interest rate of return, the marginal efficiency of capital, and project yield. See also: Present Value.

Marginal Analysis

The process of identifying the benefits or costs of alternative behaviors as unitary changes in the alternative variables occur and equalizing the benefit-cost ratios to form a point of indifference (trade-off) for decision-making purposes.

Mission

Imposed by legislation or other means. It describes the organization's reason for existence; its general functions (programs), and the limits of its jurisdiction.

Model

A schematic representation of the relationships that define a situation under study. A model may be mathematical equations, computer programs, or any other type of representation, ranging from verbal statements to physical objects. Models permit the relatively simple manipulation of variables to determine how a process, object, or concept would behave in different situations.

A *decision model* is a model which, in effect, performs management's planning and control functions--to the extent that management so delegates when the model is constructed and implemented.

Objectives

Outputs that the decision maker wants to attain. Hence, the end product or output of a program element. Objectives are measurable and specify the quality and quantity of output within time limits. They correspond to program elements while subobjectives correspond to program subelements.

Operations Research (OR)

The use of analytic methods adopted from mathematics and other disciplines for solving operational problems. Among the common techniques used in operating research are: linear programming probability theory, information theory, Monte Carlo methods and queuing techniques.

Opportunity Cost

The measurable advantage foregone as a result of the rejection of the next best alternative use of resources. For example, the opportunity costs of assigning auditors to undertake a particular examination are the benefits that would have been achieved by assigning the auditors to the next best alternative audit.

Outputs

End product or intermediate action resulting from the accomplishment of a program effort that can be quantified.

Output Oriented Program Structure

A format designed to emphasize and crystalize the clear and definable end results desired of the operations and activities of an agency.

Payback Period

The length of time required for the stream of net cash proceeds produced by an investment to equal the original cash outlay required by the investment. One of several project evaluation methods. Generally considered by analysts to be inferior to the present value method because it ignores project benefits and costs once the cash outlay for the investment has been recovered. Also called payoff period.

Performance Budget

A budget based upon functions, activities, and projects, whose principal analytical orientation is the measurement of efficiency of operating units. For example, such a budget in an agency might require computation of the cost per unit of mail processed for one branch of the agency and the cost per loan application processed in another branch.

Planning

Planning is the selection or identification of the overall, long-range objectives of the organization and the making of systems analyses of various possible courses of action in terms of relative costs and accomplishments or benefits in order to aid managers in deciding on courses of action (i.e., programs) to be followed in working toward achieving those objectives. These analyses are variously referred to as cost-effectiveness, cost utility, or cost-benefit (benefit-cost) studies.

Essentially, this level of planning involves deciding on what the organization is in business to do and generally how it is to be done. This is also called strategic planning.

Present Value (Net Present Value or Discounted Present Value)

The maximum amount that an investor or agency could pay for or invest in a project without being financially worse off. The present value method of project evaluation requires the analyst to use an interest rate to discount future benefits and costs to the present. A cost of capital concept is used by commercial enterprises to select the discount rate whereas the government borrowing rate and the social opportunity discount rate are often advocated for use by agencies of the government. The present values (P.V.) of $100 payable in two years can be defined as that amount of money necessary to invest today at compound interest in order to have $100 in two years. Thus, P.V. depends on the rate of interest, the frequency of compounding, and the time horizon selected. See also: Internal Rate of Return.

Program

A major agency endeavor, mission oriented, which fulfills statutory or executive requirements, and which is defined in terms of the principal actions required to achieve a significant end objective.

Programming

Programming is the process of deciding on specific courses of action to be followed in carrying out planning decisions on objectives. It also involves decisions in terms of total costs to be incurred over a period of years as to personnel, material, and financial resources to be applied in carrying out programs.

Program Categories

The categories in a program structure should provide a suitable framework for considering and resolving major questions of mission and scale of operations which are a proper subject for decision at the higher levels of management--within the agency. An agency generally should have between five and ten program categories. A grouping of agency programs which serve the same broad objective or which have generally similar objectives.

Program Subcategory

A subdivision established within each program category, combining agency programs on the basis of narrower objectives contributing directly to broad objectives for the program category as a whole. Subcategories should provide a meaningful substantive breakdown of program categories, and should group program elements producing outputs which have a high degree of similarity.

Program Element

A subdivision of a program subcategory comprising the specific products that contribute to the agency's objectives with an identifiable output. A program element covers agency activities related directly to the production of a discrete agency output, or group of related outputs. Agency activities which contribute directly to the output should be included in the program element, even though they may be conducted within different organizations, or financed from different appropriations. Thus, program elements are the basic units of the program structure.

Program elements have these characteristics: 1) they should produce clearly-definable outputs, which are quantified wherever possible; 2) wherever feasible, the output of a program element should be an agency end-product--not an intermediate product that supports another element; and 3) the inputs of a program element should vary with changes in the level of output, but not necessarily proportionally.

Program Subelement

Used when a further subdivision of a program element is necessary to identify in more detail specific identifiable outputs.

Program and Financial Plan (PFP)

A multi-year budget forecast based on the program structure which projects the future (usually five years) output and cost implications of current decisions and shows comparative data for the fiscal year just past, the current year, and the budget year.

The Program Memoranda (PM's)

PM's are oriented to Major Program issues. They may cover all or only a part of a program category, or cut across several program categories. Where a category is not involved in a Major Program issue, the category will not be covered by a PM. Thus, PM's will not necessarily cover the agency's entire program. The PM shows what choices the agency head has made, includes the major program recommendations of the agency for the upcoming budget, and defines authoritatively the strategy underlying those program recommendations.

Program Structure

The program structure should group agency activities in a way that facilitates comparisons of the cost and effectiveness of alternative approaches to agency objectives. To serve this purpose, program classifications should be objective-oriented, grouping activities with common objectives or common outputs. Each agency is responsible for its own program structure, subject to review. Continuing agency review of the program structure is required, with modification as necessary to meet changing conditions.

Normally, an agency program structure will include three levels of classifications: program categories, program subcategories, and program elements.

Secondary Benefits

Benefits from a project that accrue indirectly to an external entity. An example of derived secondary benefits is the increased net income of farmers and others from processing, transporting, and selling products in the area of a Bureau of Reclamation project. An example of an induced secondary benefit resulting from the project would be the net income of a new plant that located in the project area solely because of the project.

Sensitivity Analysis

A procedure by which different judgments are made about the value of a parameter and then an analysis is run with each of the different values to see what different effects result. The technique may be employed when the data base is non-existent or of such poor quality that other analytical methods cannot be employed reliably.

Simulation

An abstraction or simplification of a real world situation. Hence, in its broadest sense any model is a simulation, since it is designed to replicate some existential condition. Simulations may take the form of either deterministic models or probabilistic models.

Social Opportunity Cost Discount Rate (SOC)

A discount rate used to measure the value to society of the next best alternative uses to which funds employed in a public investment project might otherwise have been put by taxpayers. In a perfectly competitive economy the cost of such funds would be represented by the market rate of interest. Some economists believe that evaluations of proposals for federal government projects require that future costs and benefits be discounted at a discount rate which reflects both the social time preference rate and the productivity of funds in private investment.

Spillover

An economy or diseconomy for which no compensation is given (by the beneficiary) or received (by the loser). Spillover is sometimes synonymous with *externality* and with *external economy* or *external diseconomy*. See also: Secondary Benefits which is a closely related concept.

Systems Analysis

Systems analysis may be viewed as the search for and evaluation of alternatives which are relevant to defined objectives, based on judgment and, wherever possible, on quantitative methods, with the objective of presenting such evaluations to decision makers for their consideration. In this sense, systems analysis encompassed both cost-benefit and cost-effectiveness analyses and other analyses which may be more limited in scope.

Transfer Payments

In economics, grants of money that do not call for any *quid pro quo*. Examples are: 1) payments from social insurance programs that are not self-supporting, and 2) veterans' bonuses. In national income accounting, transfer payments are not included in Gross National Product but are included in personal income accounts.

Utility

A good has utility if it possesses the ability to satisfy human wants. A good has utility if it can either provide pleasure or aid in avoiding pain. It does not need to be scarce and does not necessarily have decreasing marginal utility.

Value

Unless otherwise identified, means value in exchange. The amount of some other good an item commands in exchange. To have value a good must be possessed of two essential attributes, desirability and scarcity.

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APPENDICES

SECTION 3

APPENDIX A

OMEGA STATE PLAN FOR VOCATIONAL EDUCATION

APPENDIX A

TABLE OF CONTENTS

Page

1.0 General Provisions 126

1.1 Name and Designation of State Board 126
1.2 State Administration and Leadership 126

1.21 The Office of the Executive Officer 126
1.22 Special Program Planning and Development 126
1.23 Administration Services 127
1.24 Programs of Vocational Education 127
1.25 Expenditures of Federal Funds 127

1.3 Allocation 127

1.31 Purpose of Funds 127
1.32 Determination of Utilization of Funds 128

2.0 Program of Vocational Instruction 128

2.1 Persons to be Served 128

2.11 Secondary 128
2.12 Post Secondary 129
2.13 Adult 129
2.14 Special 129

2.2 Occupations to be Served 129

2.21 Agricultural Education 129
2.22 Business and Office Education 130
2.23 Distributive Education 130
2.24 Health Occupations 130
2.25 Home Economics Education 131
2.26 Technical Education 131
2.27 Trade and Industrial Education 132

APPENDIX A

OMEGA STATE PLAN FOR VOCATIONAL EDUCATION

The State of Omega through the State Board of Vocational Education hereby submits its State Plan under the provisions of the Vocational Education Act of 1963, the George-Barden Act, the Smith-Hughes Act, and supplementary acts, as amended, and the rules and regulations with respect thereto.

1.0 General Provisions

1.1 Name and Designation of State Board--The State Board of Vocational and Adult Education is the sole agency responsible for the administration of the State Plan or for the supervision of the administration thereof by local educational agencies, and has all necessary power to cooperate with the Office of Education in the administration of the State Plan.

1.2 State Administration and Leadership--The State Board shall employ a state staff sufficiently adequate to enable it to administer, supervise, and evaluate vocational education programs, services and activities under the State Plan to the extent necessary to assure quality in all vocational education programs which are realistic in terms of actual or anticipated employment opportunities and suited to the needs, interests, and abilities of those being trained. The State Board is represented on the state Coordinating Committee for Higher Education which reviews budgets and post high school programs for all public agencies involved in higher education. The accompanying chart shows the organization of the State Board.

1.21 The Office of the Executive Officer--The Executive Officer is employed by the State Board. He recommends policy to the State Board and administers all policies on behalf of the Board. The State Director for Vocational Education also serves as executive officer of the State Board. He is representative of the State Board in all matters concerning Vocational and Adult Education in the State of Omega. He is empowered to employ staff subject to the approval of the State Board; he is authorized to recommend payment of all federal and state vocational funds to local boards of vocational and adult education and to such other agencies as may be recipients of aids under this plan. Final approval of this action is given by the State Board. He conducts state planning and development and coordinates vocational education into the total educational program for the State of Omega.

1.22 Special Program Planning and Development--Under an assistant to the director, special consideration is given to program planning and development, evaluation and reporting, coordination of programs, representation on the Coordinating Committee for Higher Education and such special assignments as may be given by the director.

1.23 Administration Services--An administrative officer directs the functions of accounting, budgeting, data processing, personnel, purchasing, records management, statistics, systems and management analysis, other related housekeeping services for the State Board and such special assignments which may be given by the state director.

1.24 Programs of Vocational Education--A head supervisor is assigned in agriculture, business and distributive education, home economics, guidance, technical education, trade and industrial education (including health occupations), guidance and general education directly related to vocational education. These programs are inter-related through a system of committees and the employment or assignment of appropriate staff in the areas of teacher training, curriculum development, research, manpower development and training, certification and evaluation.

1.25 Expenditures of Federal Funds--The state director has the authority to authorize expenditures under the State Plan as set forth in the Omega statutes and by State Board action.

1.3 Allocation of Funds--The State Board, after accepting available vocational education federal funds under the provision of the federal acts, and amendments thereto, will allocate such funds among the various uses specified therein. Allocation of these funds will consider the results of periodic evaluation of the vocational education programs. Additional consideration will be given to current and projected manpower needs and job opportunities in relationship to the vocational education needs of all groups in all areas of the state.

1.31 Purpose of Funds

1.31-1 Vocational education for persons attending high school.

1.31-2 Full time preparatory programs which provide vocational education for persons who have completed or left high school and who are available for full-time study in preparation for entering the labor market.

1.31-3 Occupational extension programs which provide vocational education for persons who have already entered the labor market and who need training or retraining to achieve stability for advancement in employment.

1.31-4 Special programs which provide vocational education for persons who have academic, social or economic or other handicaps that prevent them from succeeding in a regular vocational education program.

1.31-5 Construction of area vocational education school facilities.

1.31-6 Ancillary services and activities to assure quality in all vocational education programs.

1.31-7 Research and experimental activities which are experimental, development, demonstration or product projects designated to meet special vocational education needs in adults.

1.32 Determination of Utilization of Funds--The funds will be disbursed on the basis of projects and will require approval by the state director before a school can be qualified for vocational education funds. All expenditures will be approved by the state board. In allocating federal funds to local educational agencies, the State Board shall insure that due consideration is given to:

1.32-1 The vocational education needs of all persons of all age groups in all communities of the state.

1.32-2 The results of periodic evaluation of state and local programs and the services in light of:

1.32-21 Current and projected manpower needs and job opportunities.

1.32-22 The need for maintaining, extending and improving programs and developing new programs of vocational education.

1.32-3 Policies are based on needs determined by local and state educational agencies through such advisory services as are available. They will include programs for high school age youth; state office administration and supervision; new and expanded construction of local schools of vocational and adult education involving new full-time preparatory programs, based on present potential of full-time enrollment and needs including classroom and office furniture, new guidance services including counselors' salaries, guidance equipment, files, testing and other guidance supplies, new instructional equipment and audiovisual aids costing over $10 per item (purchased and/or rental), including projectors, tapes, records, files, transparencies, etc. Special projects of state-wide significance may be given priority claim by the state director. Developmental costs of new and expansion of full-time preparatory programs and new occupational extension classes, and limited equipment for new additional occupational extension programs.

2.0 Program of Vocational Instruction

2.1 Persons to be Served

2.11 Secondary

2.11-1 Program Objectives

2.11-11 To provide vocational education programs for youth who will not be able to continue their education beyond high school.

2.11-12 To provide vocational education for youth who are potential dropouts, or have dropped from the regular high school program.

2.11-13 To provide vocational education for youth who will continue their vocational programs in vocational or technical education after leaving high school.

2.11-14 For all other youth who seek gainful employment upon completion of the courses offered.

2.12 Post Secondary

2.12-1 Objectives--Courses will be designed to fit individuals for employment in recognized occupations. Such instruction will include training or retraining for:

2.12-11 Those preparing to enter recognized occupations upon completion of instruction.

2.12-12 Those who have already entered an occupation but desire to upgrade or update their general skills and knowledge in order to achieve stability or advancement in employment when supported by funds provided under the Vocational Education Acts. Vocational instruction shall be designed only to fit individuals for gainful employment.

2.12-13 Those who need to gain new skills and knowledges to be employable.

2.13 Adult

2.13-1 Objectives--See 2.12-1.

2.14 Special

2.14-1 Objectives--To provide vocational education for persons who have academic, socioeconomic or other handicaps that prevent them from succeeding in regular vocational education programs.

2.2 Occupations to be Served

2.21 Agricultural Education

2.21-1 Objective of Instruction--Vocational education in agriculture shall be designed to meet the needs of persons over 14 years of age who have entered upon or are preparing to enter:

2.21-11 Upon farm operation or the work of the farm and farm home.

2.21-12 Any occupation involving knowledge and skills in agriculture whether or not such occupation involves farm operation or the work of the farm and farm home.

③

2.21-2 Occupations to be Served--An agricultural occupation means an occupation involving knowledge and skills in agricultural subjects which has the following characteristics:

2.21-21 The occupation includes the functions of producing, processing and distributing agricultural products and includes services related thereto.

2.21-22 The occupation requires personnel who need competencies in one or more of the primary areas of plant science, animal science, soil science, farm management, agricultural financing, agricultural mechanization and agricultural leadership.

2.22 *Business and Office Education*

2.22-1 Objective of Instruction--Vocational education office occupations shall be designed to meet the needs of persons over 14 years of age who have entered upon or are preparing to enter occupations involving office careers.

2.22-2 Occupations to be Served--Instruction for office occupations shall be provided for one or more of the several job occupation descriptions listed in the Dictionary of Occupational Titles or for other recognized new and emerging occupations.

2.23 *Distributive Education*

2.23-1 Objectives of Instruction--Vocational education in distribution shall be designed to meet the needs of persons over 14 years of age who have entered upon or are preparing to enter any occupation involving the marketing or merchandising of goods or services.

2.23-2 Occupations to be Served--A distributive occupation means an occupation that is followed by proprietors, managers or employees engaged primarily in marketing or merchandising of goods and services. These occupations are commonly found in various business establishments such as retailing, wholesaling, manufacturing, storing, transporting, financing, and risk bearing.

2.24 *Health Occupations*

2.24-1 Objective of Instruction--Training for the health occupations shall be designed for persons who are preparing to enter one of the health occupations in hospitals or other health agencies. Other health agencies means institutions or establishments other than the hospitals which provide patients with medical or nursing service under the direction of a doctor or registered professional nurse.

2.24-2 Occupations to be Served--The health occupations render supportive services to the health professions such as nursing, medical and dental practice, all of which are concerned with providing diagnostic therapautic, preventive, restorative and rehabilitative services to people. As used in this program, such occupations:

2.24-21 Include practical or vocational nursing.

2.24-22 Include those occupations that require basic understandings and skills required in giving nursing care or other health services to people.

2.24-23 Exclude occupations recognized as occupations in other than the health field. In applying this condition, the scope and nature of the duties rather than the title of the occupation govern.

2.25 *Home Economics Education*

2.25-1 Objective of Instruction--Vocational education in home economics under the State Plan shall be designated for persons over 14 years of age, who have entered upon or who are preparing to enter upon: 1) useful employment in the home (hereinafter referred to as homemaking), and 2) gainful employment in an occupation involving knowledge and skills of home economics subjects.

2.25-2 Occupations to be Served

2.25-21 Education in Homemaking--Vocational education in homemaking means education which provides instruction which will enable families to improve the quality of their family life through more effective development and utilization of human resources.

2.25-22 Education Directed Toward Gainful Employment--Vocational education in home economics directed toward gainful employment provides instruction that qualifies individuals to engage in occupations involving knowledge and skills in home economics subject-matter areas, i.e., child development, clothing and textiles, food and nutrition, home furnishings and equipment, consumer buying and management of family problems, etc. Included are such occupations as those which provide services to families in the home and similar services in group situations; those which provide assistance to professional home economists and professionals in fields related to home economics in business agencies and organizations; and other occupations directly related to one or more home economics subject-matter areas.

2.26 *Technical Education*

2.26-1 Objectives of Instruction--Technical education programs shall be designed to train persons for employment as highly skilled technicians in recognized occupations requiring scientific knowledge in fields necessary for the national defense.

2.26-2 Occupations to be Served--Preparatory curricula and technical extension classes which are designed to prepare or upgrade persons in recognized highly skilled technical occupations requiring scientific knowledge in fields necessary for the national defense shall be eligible for partial reimbursement from federal funds, if the following conditions prevail:

> 2.26-21 The occupation has a significant number employed or an overall shortage exists or is developing. In the design, development, testing, manufacturing, processing, construction, installation, operation, maintenance, repair or servicing of plant facilities, equipment or products (or parts of accessories thereof) which are of importance for military or other defense activity, and, in providing technical services.
>
> 2.26-22 The industry or activity in which the occupation occurs is essential to the national defense, such as: the military, suppliers of products or services to the military, suppliers of products or services directly conncected with defense, and scientific research.

2.27 *Trade and Industrial Education*

2.27-1 Objectives of Instruction--Vocational education for trades and industrial occupations will be designed for persons over 14 years of age who have entered upon or are preparing to enter a trade or industrial pursuit.

2.27-2 Occupations to be Served--Trade and industrial education means education which includes any subject which is necessary to develop the manipulative skills, technical knowledge and related information such as job attitudes, safety practices and trade judgment necessary for employment in a trade and industrial occupation.

APPENDIX B

OMEGA STATE BUDGET FOR VOCATIONAL EDUCATION

APPENDIX B

BUDGET NARRATIVE

In Section 20.850(1), a request has been made for additional state funds for the employment of two supervisors of vocational education programs in the $510-$630 salary range. The request also includes funds for the employment of a Stenographer I. The department's appropriation in Year 0 is $110,730. If the request to employ new personnel is approved, the salary and travel costs will be computed on a 10-month basis, during Year 1. The total cost as indicated in the department budget request for presently employed personnel, new personnel, materials and expense, travel and capital outlay amounts to $125,240 for Year 1. An explanation of the requested increase follows:

> *New Personnel*--Two supervisors, one in the field of homemaking education and the other in business and distributive education, and one stenographer, would increase the appropriation in the amount of $7,200 for Year 1.
>
> *Travel*--The total travel allotment to the new supervisors would amount to $1,600 in state funds for Year 1.
>
> *Summary*--The total cost to the state, therefore, of salaries and travel if the request for the employment of new personnel is approved, will be $8,800 in Year 1. The remaining cost will be paid from federal funds.
>
> *Materials and Expense*--Requested increase for Year 1 is $3,900. Of the $3,900 requested, $990 is for an annual increase of $100 each for 15 employes (matched with federal funds); $1,600 for a travel allotment for 10 months to two new supervisors and $1,320 as the state share of an increased allotment for materials and supplies.

Other Increases Requested

Increases requested in Section 20.850(1) other than for new personnel includes a request for funds to meet rising costs in the materials and expense categories. State funds in the amount of $14,830 were allotted for materials and supplies, other than travel in Year 0. A request for an increase of $1,320 is included for Year 1; the total allotment for material and expense will be increased from $14,830 to $16,150 annually.

Travel

Travel costs have materially increased during the past biennium. This department prides itself on travel coordination and cost records. The Year 1 annual budget reflects a request for increased travel funds for 15 employees at $100 per employee which is matchable with federal funds. This would increase our state appropriation for this purpose in the amount of $990. The request for additional funds in the travel of two new supervisors amounts to $1,600 in Year 1.

Scholarships (Section 20.850-2)

This appropriation was decreased from $2,000 to $1,500 during the Year 0 session. While it is not a large amount, it is used to help needy students who wish to attend schools of vocational and adult education to purchase needed supplies, books and possibly such items as clothing and shoes that are also necessary if they are to attend school. No increase is requested in the appropriation.

Fire Service Training (Section 20.850-5)

The present appropriation for Fire Service Training is $30,000. It is requested that this be increased to $60,000 annually for the fiscal Year 1. An increase in staff personnel is not anticipated at this time. The additional amount would be used for an expanded training program throughout the state. During Year 0, $8,190 will be used for the salary of one supervisor and one stenographer. Approximately $3,000 will be used in travel, $1,030 for office supplies, mimeographing, printing, with a small amount set aside for equipment. The balance of approximately $18,000 will be used to reimburse vocational schools sponsoring the basic in-station training program for volunteer fire departments, for specialty schools and for several short course schools which will be held during the coming year.

A basic in-station training program is held in a department's own fire station. The training program is based on their own equipment and apparatus. It is a 25-hour course. In some instances, volunteers who have completed the basic course are given an opportunity to enroll in a 30-hour (part-time) instructor training program which prepares them for conducting basic training programs in other localities. An increased appropriation will make it possible to reach every volunteer fire department and many of the paid fire departments at least once every three or four years with some type of training program.

Comments from departments where these programs have been given, have been highly complimentary. The part-time instructors who are assigned classes in areas adjacent to their homes have been doing excellent work and are well received by the other departments. The average cost for one preliminary session and 10 training sessions, two and a half hours in length, and the necessary travel is estimated at $230. With an increased appropriation, it is possible that from 150 to 200 basic in-station programs can be offered in Wisconsin in Year 0 and a like number in Year 1.

State Aid (Section 20.850-11)

This appropriation has remained at $420,000 annually. It is used to reimburse local boards of vocational and adult education for a portion of the amount expended for salaries for instruction and supervision. No school may be reimbursed more than one-half the amount actually expended for instructional salaries and not to exceed $30,000 for the city of the first class nor $15,000 for any other city. It has been necessary to prorate this amount to the point that even the smaller schools have received less than one-third reimbursement. The requested appropriation of $630,000 is necessary to carry out the provisions of the state aid act on the above basis.

State Aid (Section 20.850-11a)

Provided additional state aid in the amount of $180,000 for one year only.

State Aid Part-Time Instruction in Agriculture (Section 20.850-12)

This appropriation was increased in the Year 0 session. It is used to reimburse local boards of education and boards of vocational and adult education for a portion of the cost of instruction incurred by the above boards in conducting part-time classes in agriculture. No increase is requested.

Text Material (Section 20.850-41)

This is a revolving fund for the preparation, publication and distribution of text material for schools of vocational and adult education. It was established in the past with an original appropriation of $2,000.

Federal Aid, George-Barden Act (Section 20.850-431)

Federal funds are made available to Omega as aids to vocational education programs in agriculture, distributive education, homemaking and trade and industrial education. The original George-Barden Act authorized the payment of aids to the several states and territories of $28,500,000,000. However, this appropriation must come before Congress every session and it has been only the last two years that the full amount of the authorized appropriation has been made available. In Year 0, Omega will receive $839,600; of this amount, approximately $51,000 will be used to match salary costs. If the request for new personnel is approved, an additional $4,650 will be used for that purpose. Travel expenditures are also matchable in the amount of $11,000 and materials and supplies in the amount of $5,880. The vocational agriculture and rural vocational homemaking programs operating in the high schools of the state will receive approximately 60% of this allotment for aids.

Smith-Hughes Act (Section 20.850-432)

The Smith-Hughes Act appropriates money to the several states and territories as aids to vocational education programs in agriculture, trade and industry, homemaking and teacher-training. The appropriation is based on population and the $165,280 is the total amount to which Omega is entitled. The use of federal funds under this act or matching of state expenditures is limited to the amount of teacher-training funds allotted to the state and covered only supervisors salaries, their supporting staff salaries and travel costs. Approximately $18,000 will be used to match such state costs with the balance being used as aids to localities conducting vocational programs in the above fields. High school vocational agriculture programs are aided in the amount of $80,030 from the Smith-Hughes Act.

Federal Aid Veterans-on-the Farm Training Program (Section 20.850-44)

Since the beginning of the veterans training program at the close of World War II, this department has supervised and administered a veterans-on-the farm training program. The funds for this purpose were made available by the federal Veterans Administration. From a staff of 14 persons and reimbursements to localities totaling several million dollars a year, the program has decreased to a supervisor and a clerical worker part-time. The total cost of salaries and travel for this program is provided by the veterans administration.

APPENDIX B

SUMMARY OF REQUESTED INCREASES
Section 20.850-1

	Appropriation Year 0	Requested Year 1
Personal Services[1]	$ 82,950.00	$ 92,830.00
Materials and Expense	27,500.00	31,400.00
Capital Outlay	280.00	1,000.00
TOTALS	110,730.00	125,230.00
		110,730.00
Total Increase During the Year		14,500.00

Breakdown on Increases	
Personal Services	9,880.00[1]
Materials and Expense	3,900.00[2]
Capital Outlay	730.00
TOTALS	14,510.00
Personal Service Increase:	
Personal Services Year 0	82,950.00
Merit Increases Year 1	2,480.00
New Personnel Year 1	7,400.00[3]
TOTALS	92,830.00

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[1] Two new supervisors, 10 months employment

[2] Travel Increases, $2,590.00; Materials and Expense $1,310.00

[3] 10 months employment

APPENDIX B

Department: VOCATIONAL EDUCATION, BOARD OF

Revenues Summary
Section 20.850

Description	Sub. Sec.	Budget (Year 0)	Departmental Request (Year 1)	Governor's Recommendations (Year 1)
REVOLVING BUDGET REVENUES		1,017,930	1,018,100	
Text Material	41	700	700	
Federal Aid--George Barden, Adm.	431	73,340	84,040	
Federal Aid--Aids to Localities		1,766,260	755,560	
Federal Aid--Smith-Hughes, Adm.	432	20,820	21,550	
Federal Aid--Aids to Localities		144,460	143,740	
Fed. Aid--Farm Trg. Prog. Adm.	441	12,340	12,520	
Federal Aid--Aids to Localities	44			
Year 0 Budget Summary				

Department: VOCATIONAL EDUCATION, BOARD OF Section 20.850 (1)
Appropriate Title: General Administration

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic	$ 82,950	$ 92,830	
Present Positions	82,950*	85,230	
New Positions	--	7,600	
Cost-of-Living Salary Bonus	12,700	14,050	
Materials and Expense	27,500	31,400	
Travel	12,670	15,260	
Printing	1,200	1,500	
Office Supplies	1,150	1,500	
Postage	1,200	1,600	
Telephone and Telegraph	570	700	
Rent and Rentals	9,970	10,000	
Light, Heat and Power	150	150	
Repairs and Maintenance	250	200	
Other Supplies	50	100	
Other Services	290	400	
Leasehold Improvements			
Capital Outlay	280	1,000	
Total Expenditures	123,430	139,290	
Total Revenues--Nonappropriated			
Total Closing Balances--Lapsed			
Total Personnel in Man-years	14.8	16.2	

Program, Narrative, Workload, Justification, Etc.

*Cost of pay plan $9,070

See attached narrative.

This appropriation finances the state's share of the cost of administering and supervising vocational education programs in the high schools and vocational schools. Federal funds under the George-Barden and Smith-Hughes Acts pay slightly less than half of the total administrative costs. One new clerical and two supervisory positions are requested for which state funds are budgeted for the equivalent of one-half clerical and one and one-fourth supervisory positions. Supervision is divided into four areas:

Trades and Industry--One chief and three supervisors make up the present division staff who supervise programs in the trade and industrial field.

Homemaking--This division, composed of a chief and two supervisors serves 61 vocational schools and 145 high school homemaking departments, with 234 full-time teachers, and 616 part-time teachers. One new supervisor is requested. A 40% annual turnover among homemaking teachers complicates the division's work.

Business and Distributive Education--One and one-half supervisors work in this field, mainly on distributive education, which includes salesmanship, credits and collections, waitress training, etc. One new supervisor is requested to concentrate in business education to help vocational schools' increasing demand for office personnel.

Vocational Agriculture--One chief and three supervisors supervise 281 vocational agriculture departments in high schools and two vocational schools.

APPENDIX B

Department: VOCATIONAL EDUCATION, BOARD OF Section: 20.850(2)

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic			
Present Positions			
New Positions			
Cost-of-Living Salary Bonus			
Materials and Expense			
Travel			
Printing			
Office Supplies			
Postage			
Telephone and Telegraph			
Rent and Rentals			
Light, Heat and Power			
Repairs and Maintenance			
Other Supplies			
Other Services			
Aids to Individuals	$1,500	$1,500	
Capital Outlay			
Total Expenditures	1,500	1,500	
Total Revenues			
Total Closing Balances--Lapsed			
Total Personnel in Man-years			

Program, Narrative, Workload, Justification, Etc.

APPENDIX B

Department: VOCATIONAL EDUCATION, BOARD OF
Appropriate Title: Fire Schools Section: 20.850-5

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic	$ 8,190	$ 8,530	
Present Positions	8,190	8,530	
New Positions			
Cost-of-Living Salary Bonus	1,850	1,850	
Materials and Expense	6,140	6,520	
Travel	2,800	3,000	
Printing	450	500	
Office Supplies	170	200	
Postage	250	300	
Telephone and Telegraph	100	130	
Rent and Rentals	20	20	
Light, Heat and Power			
Repairs and Maintenance	30	30	
Other Supplies	300	300	
Other Services	2,030	2,050	
Aids to Localities	13,730	43,010	
Capital Outlay	100	100	
Total Expenditures	30,000	60,000	$30,000
Total Revenues			
Total Closing Bal.--Cont. Exp.	227		
Total Personnel in Man-years	2	2	

Program, Narrative, Workload, Justification, Etc.

The state board conducts a training program for volunteer and paid fire departments throughout the state. The goal of the board is to provide training for all departments in the state every three or four years.

The program at the state level consists primarily of training local firemen who will work out of local vocational schools to provide intensive training in all areas of the state. Most of the appropriation will be used to pay the expenses of these local instructors.

APPENDIX B

Department: VOCATIONAL EDUCATION, BOARD OF
Appropriate Title: Vocational and Adult Education, State Aid

Section 20.850(11)(lla)

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic			
Present Positions			
New Positions			
Cost-of-Living Salary Bonus			
Materials and Expense			
Travel			
Printing			
Office Supplies			
Postage			
Telephone and Telegraph			
Rent and Rentals			
Light, Heat and Power			
Repairs and Maintenance			
Other Supplies			
Other Services			
Aids to Localities (lla)	$180,000		
Aids to Localities (11)	420,000	$634,000	$634,000
Capital Outlay			
Total Expenditures	600,000	634,000	
Total Revenues			
Total Closing Balances			
Total Personnel in Man-years			

Program, Narrative, Workload, Justification, Etc.

Section 4121(1) establishes state aid and the basis of one-half the amount actually expended for salaries, for instruction and supervision, but not to exceed $30,000 for any city of the first class and $15,000 for any other city, town or village. The amount estimated as necessary to meet full provisions of the law is $634,000. The law provides for prorate payment if the amount appropriated is insufficient to meet this full amount.

APPENDIX B

Department: VOCATIONAL EDUCATION, BOARD OF
Appropriate Title: Vocational Education in Agriculture
Section 20.850(12)

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic			
Present Positions			
New Positions			
Cost-of-Living Salary Bonus			
Materials and Expense			
Travel			
Printing			
Office Supplies			
Postage			
Telephone and Telegraph			
Rent and Rentals			
Light, Heat and Power			
Repairs and Maintenance			
Other Supplies			
Other Services			
Aids to Localities	$75,000	$75,000	$75,000
Capital Outlay			
Total Expenditures	75,000	75,000	75,000
Total Revenues			
Total Closing Balances--Lapsed			
Total Personnel in Man-Years			

Program, Narrative, Workload, Justification, Etc.

This provides aids to high schools and vocational schools conducting part-time classes for young and adult farmers.

Department: VOCATIONAL EDUCATION, BOARD OF
Appropriate Title: Text Material
Section: 20.850(41)

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic			
Present Positions			
New Positions			
Cost-of-Living Salary Bonus			
Materials and Expense	$ 650	$ 650	
Travel			
Printing	250	250	
Office Supplies	200	200	
Postage	200	200	
Telephone and Telegraph			
Rent and Rentals			
Light, Heat and Power			
Repairs and Maintenance			
Other Supplies			
Other Services			
Capital Outlay			
Total Expenditures	650	650	
Total Revenues--Revolving	700	700	
Total Closing Balances--Cont.	2,460	2,520	
Total Personnel in Man-years			

Program, Narrative, Workload, Justification, Etc.

This is a revolving fund for preparation of text material for schools of vocational and adult education. The schools reimburse the board for the actual cost of the materials.

APPENDIX B

Department: VOCATIONAL EDUCATION, BOARD OF
Appropriate Title: Federal Aid, George-Barden Section: 20.850(431)

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic	$ 50,000	$ 56,640	
Present Positions	50,000	51,990	
New Positions		4,650	
Cost-of-Living Salary Bonus	9,470	10,430	
Materials and Expense	13,750	16,850	
Travel	9,380	11,100	
Printing	1,200	1,500	
Office Supplies	1,150	1,500	
Postage	1,200	1,600	
Telephone and Telegraph	570	700	
Rent and Rentals			
Light, Heat and Power	150	150	
Repairs and Maintenance			
Other Supplies			
Other Services	100	200	
Aid to Vocational Schools	776,420	766,260	
Capital Outlay	130	130	
Total Expenditures	849,760	850,300	
Total Revenues--Revolving Aids	766,260	755,560	
Total Revenues--Revolving Adm.	73,340	84,040	
Total Closing Bal.--Aids Cont.	766,260	755,560	
Total Personnel in Man-Years	10.3	11.3	

Program, Narrative, Workload, Justification, Etc.

Administration	1	73,340	84,040	
Aid to Vocational Schools	5	776,420	766,260	
Scholarships	6			
Total Expenditures		849,760	850,300	

This is a federal grant which may be used to pay part of the state expense for administering vocational programs. The rest of the appropriation is paid out as aid to the high schools (vocational agriculture and homemaking) and the vocational schools (vocational agriculture, homemaking, business and distributive education and trades and industry education). Money from this appropriation would supply matching funds for the salaries of the new positions requested in 20.850-1.

APPENDIX B

Department: VOCATIONAL EDUCATION, BOARD OF
Appropriate Title: Federal Aid, Smith-Hughes Section 20.850(432)

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic	$ 15,750	$ 16,330	
Present Positions	15,750	16,330	
New Positions			
Cost-of-Living Salary Bonus	2,770	2,770	
Materials and Expense	2,300	2,450	
Travel	2,300	2,450	
Printing			
Office Supplies			
Postage			
Telephone and Telegraph			
Rent and Rentals			
Light, Heat and Power			
Repairs and Maintenance			
Other Supplies			
Other Services			
Aid to Vocational Schools	142,490	144,460	
Capital Outlay			
Total Expenditures	163,310	166,010	
Total Revenues--Revolving Aids	144,460	143,740	
Total Revenues--Revolving Adm.	20,820	21,550	
Total Closing Bal.--Aids Cont.	144,460	143,740	
Total Personnel in Man-years	3	3	

Program, Narrative, Workload, Justification, Etc.

Administration	1	20,820	21,550
Aid to Vocational School	5	142,490	144,460
Total Expenditures		163,310	166,010

This is a continuing federal appropriation of fixed amount. A small part may be used to match state administrative salaries and travel, and the remainder must be paid as aids to high schools and vocational schools.

Department: VOCATIONAL EDUCATION, BOARD OF
Appropriate Title: Federal Aid, Farm Training Program
Section 20.850(44), (441), (442)

Description	Budget (Year 0)	Departmental Requests (Year 1)	Governor's Recommendations (Year 1)
Personal Services Basic	$ 7,930	$ 8,170	
Present Positions	7,930	8,170	
New Positions			
Cost-of-Living Salary Bonus	1,620	1,620	
Materials and Expense	2,730	2,730	
Travel	2,640	2,640	
Printing			
Office Supplies			
Postage			
Telephone and Telegraph			
Rent and Rentals			
Light, Heat and Power			
Repairs and Maintenance			
Other Supplies			
Other Services	90	90	
Aids to Localities			
Capital Outlay			
Total Expenditures	12,280	12,520	
Total Revenues--Revolving Aids			
Total Revenues--Revolving Adm.	12,340	12,520	
Total Closing Bal.--Aids Cont.	-10	-10	
Total Personnel in Man-years			

Program, Narrative, Workload, Justification, Etc.

Administration	1	12,280	12,520
Aids to Localities	5		
Total Expenditures		12,280	12,520

This is a federally financed program for supervisors of the "On-the-Farm" training program under P.L. 550 (Korean G.I. Bill).

APPENDIX C

PROGRAM EVALUATION CHECKLIST

PROGRAM EVALUATION CHECKLIST

The following list of questions has been assembled for the use both of consumers and producers of key documents in the Planning-Programming-Budgeting System. It focuses mainly on the analyses to be reflected in the Program Memoranda (PM) although some points relate to the Program and Financial Plans (PFP).

Objectives

Perhaps the most difficult and important task of analysis of programs in the public sector is being clear on objectives and the contribution of specific programs to specific objectives.

1. What assertions are made about overall state objectives? What authority is quoted? The governor? The legislature? The agency head? How specific and concrete is the statement of objectives? To what extent is the government committed to these objectives? What form does the commitment take? Executive statements? Statutes? Agreement with legislative committees? Moral obligations? How much room for interpretation is there? For example, is it clear over what time period the objectives should be met? Does the PM translate general, abstract, vague objectives into operationally meaningful ones?

2. Is it clear what should be the state government's responsibility to the cited or proposed objectives? Has the alternative of greater contribution by federal and local agencies or the private sector been considered? Should it be a state responsibility at all?

3. Is the relationship between broad state goals and specific agency goals clearly stated? Is it reasonable? What policies, legislation and statements of fact are implicit in the objectives? Should they be made explicit? Are they right?

4. Are the agency goals stated in terms which have operational meaning? Have they been expressed quantitatively? Is there a time table for accomplishment?

5. Has the relationship among related goals in different parts of the same agency or in different agencies been made explicit (e.g., the War on Poverty)? Does the analysis adequately take into account other efforts to accomplish these goals--efforts by other agencies of the state government, by federal or local governments, or by the private sector? Is the impact of the agency's programs on the goals of other agencies noted?

6. Have the agency's priorities among objectives and programs been made clear? If more, or fewer, funds are available than in the basic case assumed by the agency, is it evident what the agency would propose to add or delete from its programs?

7. What is the evidence that the alleged "need" for goods and services exists in the sense that people would be willing to pay for the service? Given this evidence, does the analysis show that the agency's proposed scale of operation is best? Or has the agency proposed fulfillment of all potential "need" for the service by employing an implicit price level of zero? On the other hand, has it stopped short of fulfilling demand willing to meet the proper price? Why? Was a budget constraint the reason for this? Can a better budget justification be made if this is the case (perhaps as the result of further study)?

Measures of Effectiveness

The private sector (and certain business-like governmental activities) have profits which serve as a guide to performance; most governmental agencies have to develop their own specific indicators of performance. This is often difficult to do well and errors of various kinds are frequent.

1. To what extent are the tangible, measurable outputs of the program used by the agency adequate indicators of the extent to which the overall purposes of the program are being achieved? If inadequate, what better measures of performance might be used?

2. Are there clearly identified criteria offered by which to judge program performance? How adequate do they seem to be? Are there some alternative criteria that should be considered?

3. Have outputs been quantified to the extent useful? Where quantitative measures of program performance are missing are there logical, convincing qualitative assessments? Has the agency gone too far and attempted to quantify the unquantifiable? Is it clear where dependence on the quantitative outputs leaves off and judgment takes over?

4. Are there close substitutes for these outputs which will affect the demand for them? Are these substitutes considered in the analysis?

Financial Data

Whereas it is often very difficult to define and obtain good measures of program effectiveness, the cost side is usually easier to cope with. And often a better understanding of costs can be very useful in improving program performance.

1. Does the PM present the costs that are relevant to the issues analyzed? Have systems costs estimates been developed and presented? How complete and how accurate are these estimates? Have any valuable inputs been ignored? Are all directly related support, training and construction costs included? What additional cost analytic efforts are suggested by the quality of the agency's cost data?

2. Does the analysis describe the bases for the cost estimates? Do the estimates look reasonable?

3. Have sunk costs--past sacrifices--been omitted as they should be, except where there are significant salvage values? Have they been considered where they should be, i.e., in the evaluation of the past program?

4. In systems with multiple products, have only the nonavoidable costs been charged to a given program, or have common costs been arbitrarily allocated? What is the purpose of the allocations? Have popular programs been saddled with part of the burden of less attractive programs? That is, have costs been shifted from where they should properly be charged to where they can most easily be funded? Have costs been shifted from products with easily measured output to products with only qualitative outputs? For example, in a multipurpose dam project, are costs overallocated to recreation and underallocated to irrigation or power products?

5. Is the agency too optimistic in its assumptions on funds likely to be available for its programs? What effect should more modest assumptions have on the conclusions?

6. Is there available a record of successive agency cost estimates over time of new programs? What does this suggest about the accuracy of current claims? Why should not the agency be asked to have available a record of its estimates?

7. Is there a sensitivity analysis to show the effect of uncertainty in cost estimates on conclusions? What evidence is adduced in support of its cost estimates?

8. Have future benefits and costs been discounted? For example, if a proposed project is compared with existing ones for which future savings are expected, are those future savings discounted? On the other hand, is the case for discounting future outlays and benefits negated by the existence of a brief time span for the project, or by uncertainties?

9. Is the chosen discount rate reasonable, i.e., does it reflect alternative uses of investible funds? How sensitive are conclusions on preferred programs to the choice of discount rates?

Some Additional Points

Treatment of Alternatives

1. How thoroughly have alternative methods for accomplishing the same objectives been analyzed? Are there alternatives involving different tactics or techniques, different modes of production (more or less capital intensive), different priorities, different mixes of federal versus state and local expenditures, different financing methods, different legislative requirements? Were different levels for the agency's preferred program studied? Are mixtures of systems considered among the alternatives?

2. Have the costs and effectiveness of the major alternatives been properly assessed? Have tradeoffs been made between present and proposed programs? Were the criteria, costing methods and time span the same as for the proposed program, i.e., was the comparison fair?

3. Has adequate account been taken of the need to examine programs at the margin? Quite often the issue is not whether to have a program at all, but whether to make marginal changes in the program level or composition. Does the analysis deal with specific issues in terms of the marginal benefits and marginal costs? Does the data displayed show the effect of marginal changes or current marginal operations?

4. Has the presentation of program data in terms of arithmetic averages concealed important information about the spread in values? If an analysis supports certain conclusions about a program based on these averages, might there nevertheless be important exceptions? What are they? Should they be examined?

5. Are the alternatives analyzed real options for the agency head? Does he really have a choice? On the other hand, is there inability or unwillingness to consider radically different programs?

6. Have the constraints on the program area been explicitly treated? What are they? Have ways of modifying the constraints been explored? What reasons have been given for rejecting alternative objectives or programs? Efficiency? Statutory prohibitions? Organizational limitations? Lack of trained personnel? Lack of capital? Inadequate technology?

Models

1. Is there presented a model or simplified, quantitative description of some important aspects of the program? If this has not been attempted for a broad program area, has it been attempted for some important parts? Has the analyst failed to structure the important relationships explicitly? How adequately does the model seem to explain observed phenomena? Does it rest on structural relationships or is it based entirely on statistical correlation, i.e., is a theory offered? Does it seem plausible?

2. Can you suggest specific improvements on the model? What factors should be included that have been left out?

3. Has the analyst engaged in excessive modelism, i.e., does his work reflect more interest in the model than in the real world? Has he focused on manipulating a computational method at the expense of dealing with important factors in a sensible way?

4. Are there severe suboptimizations? Have elements that should be regarded as variables by the agency head or the governor been allowed to vary, or are there restrictions imposed in the process of dividing the analysis into lower level problems?

Treatment of the Future

1. Has the proper span of years been considered? Does the PFP or the PM go too far, or not far enough, into the future? Beyond the immediate period, is there simply a mechanical projection of recent trends which fails to take adequate account of possible changes in policy, technology, costs, or availability of funds?

2. Has an explicit, time phased, decision strategy been presented which allows for options being opened up and foreclosed, research being done, experiments being carried out, and data gathered? Alternatively, is the program area characterized by a collection of unstructured *ad hoc* programs and decisions without a coherent theory? If the latter, what should be done to improve the situation?

3. Does the PM show a range of possible future options as to program objectives and means of achieving these objectives? Does it show over what period of time in the future it should become possible to choose among these options? Does it show what evidence should dictate a choice among options?

4. Is the proposed program level shown dependent on how well the program performs over the next year or two? Is there any discussion of the evidence that should dictate cutting off the program entirely or redirecting it drastically?

5. Have economic, demographic, cultural trends been explicitly taken into account? How adequately?

Uncertainty--Program uncertainty can be of various kinds: e.g., there can be uncertainty because of a lack of clarity in objectives, risk (statistical uncertainty), new technology, factors external to the program (e.g., the future level of economic activity), inadequate bases for estimating costs, and inadequate bases for estimating consumer demand.

1. Have the adequacies and inadequacies of data on major issues been discussed? What data are inadequate, does the PM state what action will be taken to improve the situation?

2. Aside from data problems, are there important underlying uncertainties about program effectiveness or costs? Is there important technological uncertainty? Does the PM state what additional analysis or research is being undertaken to reduce these uncertainties?

3. Have sensitivity tests been carried out to determine how the uncertainties affect program recommendations (e.g., has a "break even" analysis been made which shows what the value of an uncertain parameter would have to be in order to get equivalence among alternative programs)?

General

1. Have the programs covered in the PM been described clearly, concisely, and quantitatively?

2. Are critical assumptions, relationships and facts spelled out? In any program area, a few factors usually are much more important than the rest. Does the analysis identify and focus on these critical factors? Or does it handle the important ones by assumption and concentrate on less important ones?

3. Have the most important data on a program area been presented or are key assertions made without supporting data? Should the agency

be asked to prepare and forward additional data prior to the fall budget review?

4. Has the program "base" been analyzed or has the analysis been limited largely or entirely to new programs?

5. Have the recommendations presented on a program area been compared with earlier agency recommendations on the same subject? Have data on actual program performance been compared with earlier agency claims for the program?

6. Is the recommended program composition and level based on an overall analysis of (a) need or effective demand; (b) an arbitrary rule of thumb (e.g., x percent more than last year's level); (c) presidential commitment; (d) an estimate of the level that the Congress will accept; or (3) other considerations?

7. Where the analysis is inadequate or incomplete, does the PM indicate what future work is planned to improve it; the data to be gathered, criteria to be applied, method of analysis to be used?

APPENDIX D

A BENEFIT-COST PROBLEM

A BENEFIT-COST PROBLEM

The Situation

As a member of the State Department of Education with responsibility for implementation of the Vocational Amendments of 1968, you are to develop a cost-benefit study comparing the expected benefits and costs of establishing a two-year post-high school program versus a two-year high school program. In the past, vocational leadership in the state has emphasized high school vocational education, and since the passage of PL. 88-210 has been attempting to expand post-secondary programs with limited success. However, some employers are starting to ask for new workers with additional preparation beyond high school.

The administration and board of education in a large city district are considering the expansion of vocational education in their schools by the establishment of an additional program. This program will serve the two largest occupational classifications in the city.

Data given in Tables 1 and 2 have been derived from the best estimates of future construction and operating costs from historical data on employment and salary levels of graduates from the present programs. The cost figures for the post-high program are based on an annual graduating class of one hundred. Costs of the high school program are based on an annual graduating class of 50.

Discount rates and present value of future earnings are given in Tables 3 and 4.

The Assumptions

1. Costs given in Tables 1 and 2 are the summation of all costs of the two-year program for a graduating class. Initial building and equipment costs have been amortized to an annual basis and doubled for the two-year program.

2. Benefits given in Tables 1 and 2 are assumed to be the average annual earnings per graduate. Initially, assume the effect of education has a ten-year life.

3. Annual salaries of nongraduates were derived from the earnings of high school graduates.

The Analysis

Step A. What are the benefit-cost ratios and the optimum economic decisions using:

1) An interest rate of 0.00
2) An interest rate of 0.05
3) An interest rate of 0.10

Step B. Would the decisions be different if net present value were used as the criteria for evaluation instead of cost-benefit ratios? Why?

Step C. What, if any, are the critical factors in this analysis? What would be the effect of changing those factors?

Step D. What further information would be necessary to make a definite recommendation in a real situation?

TABLE 1. ESTIMATES OF THE BIENNIAL COSTS AND BENEFITS OF THE PROPOSED POST-HIGH PROGRAM

Costs and Benefits	Years										
	0	1	2	3	4	5	6	7	8	9	10
Benefits											
Annual Salary per Graduate		$4,000	$5,000	$6,000	$6,000	$7,000	$8,000	$9,000	$10,000	$10,000	$10,000
Annual Salary per Nongraduate		4,000	4,000	4,000	5,000	5,000	5,000	6,000	6,000	6,000	6,000
Net Benefit per Graduate			1,000	2,000	1,000	2,000	3,000	3,000	4,000	4,000	4,000
Costs											
Fixed:											
Building	$ 50,000										
Equipment	25,000										
Miscellaneous	25,000										
Total	100,000										
Operating:											
Administration	25,000										
Instruction	87,500										
Equipment	12,500										
Depreciation	12,500										
Miscellaneous	12,500										
Total	150,000										
Foregone Earnings of Students	750,000										
Total Biennial Costs	1,000,000										

APPENDIX D

TABLE 2. ESTIMATES OF THE BIENNIAL COSTS AND BENEFITS OF THE PROPOSED HIGH SCHOOL PROGRAM

Costs and Benefits	Years										
	0	1	2	3	4	5	6	7	8	9	10
Output											
Annual Salary per Graduate		$6,000	$6,000	$7,000	$7,000	$7,000	$7,000	$8,000	$8,000	$8,000	$8,000
Annual Salaries of Nongraduates		4,000	4,000	4,000	5,000	5,000	5,000	6,000	6,000	6,000	6,000
Net Benefits per Graduate		2,000	2,000	3,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Inputs											
Fixed:											
Building	$25,000										
Equipment	25,000										
Miscellaneous	6,250										
Total	56,250										
Operating:											
Administration	12,500										
Instruction	31,250										
Equipment	12,500										
Depreciation	6,250										
Miscellaneous	6,250										
Total	68,750										
Foregone Earnings of Students	375,000										
Total Biennial Costs	500,000										

TABLE 3. FUTURE EARNINGS DISCOUNTED AT FIVE PERCENT

Time (Years)	Discount Rate $(1 + .05)^n$	Present Value of Annual Salaries Discounted at Five Percent									
		$1,000	$2,000	$3,000	$4,000	$5,000	$6,000	$7,000	$8,000	$9,000	$10,000
0	1.00	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
1	1.05	952	1,904	2,856	3,808	4,762	5,714	6,666	7,619	8,571	9,524
2	1.10	909	1,818	2,727	3,636	4,545	5,454	6,364	7,273	8,182	9,091
3	1.16	862	1,724	2,586	3,448	4,310	5,172	6,034	6,896	7,759	8,621
4	1.22	820	1,640	2,460	3,280	4,098	4,918	5,738	6,557	7,377	8,197
5	1.28	781	1,562	2,343	3,124	3,906	4,688	5,469	6,250	7,031	7,812
6	1.34	746	1,492	2,238	2,984	3,731	4,478	5,224	5,970	6,714	7,463
7	1.41	709	1,418	2,127	2,036	3,546	4,255	4,964	5,674	6,383	7,092
8	1.48	676	1,352	2,028	2,704	3,378	4,054	4,730	5,405	6,081	6,757
9	1.55	645	1,290	1,935	2,580	3,226	3,871	4,516	5,161	5,806	6,452
10	1.63	614	1,228	1,842	2,456	3,067	3,681	4,294	4,908	5,521	6,135
20	2.65	377	754	1,131	1,508	1,887	2,264	2,642	3,019	3,396	3,774
40	7.06	142	284	426	568	608	850	992	1,133	1,275	1,416

APPENDIX D

TABLE 4. FUTURE EARNINGS DISCOUNTED AT TEN PERCENT

Time (Years)	Discount Rate $(1.10)^n$	Present Value of Annual Salaries Discounted at Ten Percent									
		$1,000	$2,000	$3,000	$4,000	$5,000	$6,000	$7,000	$8,000	$9,000	$10,000
0	1.00	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
1	1.10	909	1,818	2,727	3,636	4,545	5,454	6,363	7,272	8,181	9,090
2	1.21	826	1,652	2,478	3,304	4,130	4,956	5,782	6,608	7,434	8,260
3	1.33	752	1,504	2,256	3,008	3,760	4,512	5,264	6,016	6,768	7,520
4	1.46	685	1,370	2,055	2,740	3,425	4,110	4,795	5,480	6,165	6,850
5	1,61	621	1,242	1,863	2,484	3,106	3,726	4,347	4,968	5,589	6,210
6	1.77	565	1,130	1,695	2,260	2,825	3,390	3,955	4,520	5,085	5,650
7	1.95	513	1,026	1,539	2,052	2,565	3,077	3,591	4,104	4,617	5,130
8	2.14	467	934	1,401	1,868	2,335	2,804	3,271	3,736	4,203	4,670
9	2.35	426	852	1,278	1,704	2,130	2,553	2,982	3,404	3,834	4,260
10	2.58	388	776	1,164	1,552	1,940	2,326	2,716	3,104	3,492	3,880
20	6.81	144	288	432	576	735	882	1,029	1,176	1,323	1,470
40	46.22	22	44	66	88	110	132	154	176	198	220

APPENDIX D

Discussion of Analysis

Steps A and B.

Criteria	Post-High Program	High School Program
Benefit-Cost Ratios		
0.00	2.400	2.100
0.05	1.712	1.629
0.10	1.262	1.306
Net Present Value		
0.00	$1,400,000	$550,000
0.05	712,000	314,500
0.10	261,500	152,800

Step C.

Critical Factors	Effect
1. Annual Salaries	
2. Future Costs	
3. Interest Rates	
4. Size and Number of Schools	
5. Cause-Effect Relationship Between Education and Income	
6. Direction of Economic Growth in the Area	
7. Noneducational Investment Alternatives	
8. Social, Cultural, and Political Aspects	

Critical Factors	Effect
9. Ability and Interest of Students	
10. Migration of Graduates	
11. Local, State or National Analysis	
12. Effect of Graduates upon the Wage Levels	
13. Specific Occupational and Academic Programs in Schools	
14. Future Level of Unemployment	
15.	

Step D. Additional Information

1. Specific Location of Schools
2. Direction of Economic Growth
3. Manpower Projections (Labor Market)
4. Student Population Projections
5.
6.

General Comments

1. Net present value and benefit-cost ratios do not necessarily lead to the same conclusion.
2. Changing the interest rate can change the relative position of investment alternatives.
3. There are a very large number of implicit assumptions in any benefit-cost analysis.
4. Benefit-cost analysis is only one of many criteria for program evaluation.